ICOM

SERVICE MANUAL

MARINE PLOTTER/SOUNDER

FP-561

DGPS BEACON RECEIVER

RD-200

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the **FP-561 MARINE PLOTTER/SOUNDER** and **RD-200 DGPS BEACON RECEIVER** at the time of publication.

MODEL	VERSION	SYMBOL
FP-561	General	GEN
	Europe	EUR

To upgrade quality, all electrical or mechanical parts and internal circuits are subject to change without notice or obligation.

DANGER

NEVER connect the unit to an AC outlet or to a DC power supply that uses more than 33 V (FP-561) or 16 V (RD-200). Such a connection could cause a fire hazard and/or electric.

DO NOT expose the unit to rain, snow or any liquids.

DO NOT reverse the polarities of the power supply when connecting the unit.

DO NOT apply an RF signal of more than 20 dBm (100mW) to the antenna connector. This could damage the unit's front end.



FP-561



RD-200

ORDERING PARTS

Be sure to include the following four points when ordering replacement parts:

1. 10-digit order numbers
2. Component part number and name
3. Equipment model name and unit name
4. Quantity required

<**SAMPLE ORDER**>

0910051392	PCB B-5305	FP-561	MAIN UNIT	1 pieces
8810004540 Screw	BiH 3x8 SUS	FP-561	Chassis	10 pieces

Addresses are provided on the inside back cover for your convenience.

REPAIR NOTES

1. Make sure a problem is internal before disassembling the unit.
2. **DO NOT** open the unit until the unit is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits or electronic parts. An insulated turning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the unit is defective.
6. **READ** the instructions of test equipment thoroughly before connecting equipment to the unit.

TABLE OF CONTENTS

SECTION 1 SPECIFICATIONS

1-1 FP-561

■ GENERAL

• Display	: 5.6 inch TFT color LCD (320×234 pixels)
• Power supply requirement	: 11–30 V DC
• LCD brightness	: 16 levels
• Power consumption	: Less than 22 W (Less than 1.8 A at 12 V DC)
• Dimensions (projections not included)	: 186(W)×203(H)×102(D) mm; 7 5⁄16(W)×8(H)×4(D) in
• Weight (approx.)	: 2.2 kg; 4 lb 14 oz
• Usable temperature range	: 0˚C to +50˚C; +32˚F to +122˚F
• Unit of water depth	: m (meter), FT (feet), FM (fathom)
• Unit of water temperature	: ˚C, ˚F
• Unit of speed	: KT (knots), km/h, MI/h (miles/h)
• Unit of distance	: NM (nautical miles), km, MI (miles)
• Input data format	: NMEA0183, Water temp./speed, DGPS
• Output data format	: NMEA0183 (GGA, GLL, XTE, AAM, VTG, BOD, WPL, BWC), Start-stop serial forward; 4800 bps

■ GPS

• Receive system	: 12 parallel-channel, all-in-one view
• Receive frequency	: 1575.42 MHz (±1 MHz)
• Measuring accuracy (2DRMS)	: Position 100 m, 95% of the time, PDOP≤3 (Less than 100 m, S/A OFF) Speed Less than 1 m/sec. (PDOP≤3, S/A ON)

NOTE: All GPS receivers are subject to degradation of position and velocity accuracy under the U.S. Department of Defence.

• Data renewed interval	: 1 sec.

■ PLOTTER

• Scale setting	: 16 steps
• Plotting interval	: 5 sec. to 60 min., 0.01–9.99 NM*
• No. of track memories	: 5000 (selectable from 7 colors)
• No. of route memories	: 20 (50 points/route)
• No. of event markers	: 500
• Navigation computer	: Vessel position (longitude/latitude), cursor position, distance, elapsed time, course-out distance, direction, distance, time
• Data indication	: Coastline, place name, contour line, route, lighthouse, longitude/latitude line
• Alarm	: Area and Arrival alarms

■ VIDEO SOUNDER

• Transmission freq.	: 50 kHz, 200 kHz
• Output power	: 500 W RMS
• Water depth range	: 5–640 m* in 8-color indication
• Water temp. range	: 0˚C to +40˚C; +32˚F to +104˚F
• Speed range	: 0.0–99.9 KT*
• Bottom lock expansion range	: 5 m*, 10 m*, 20 m*, 40 m*
• Phase shift variable range	: 1–640 m*
• Type of display screen	: Standard, A-scope, dual frequencies, bottom and marker zoom
• Picture sweep speed	: 6 levels including pause
• Alarm	: Shallow, depth and fish school

*selectable in each unit

1-2 RD-200

■ GENERAL

• Frequency coverage	: 283.5 kHz to 325.0 kHz
• Type of emmision	: 1K0F2B
• Antenna impedance	: 50 Ω nominal
• Intermediate frequency	: 455 kHz
• Usable temperature range	: –20˚C to +70˚C; –4˚F to +158˚F
• Power supply requirement	: 12 V DC nominal negative ground
• Current drain (at 12 V DC)	: Less than 0.2 A
• Dimensions (projections not included)	: 140(d)×157.2(H) mm; 5½(d)×6³⁄₁₆(H) in
• Weight	: 1.0 kg; 2 lb 3 oz

■ RECEIVER

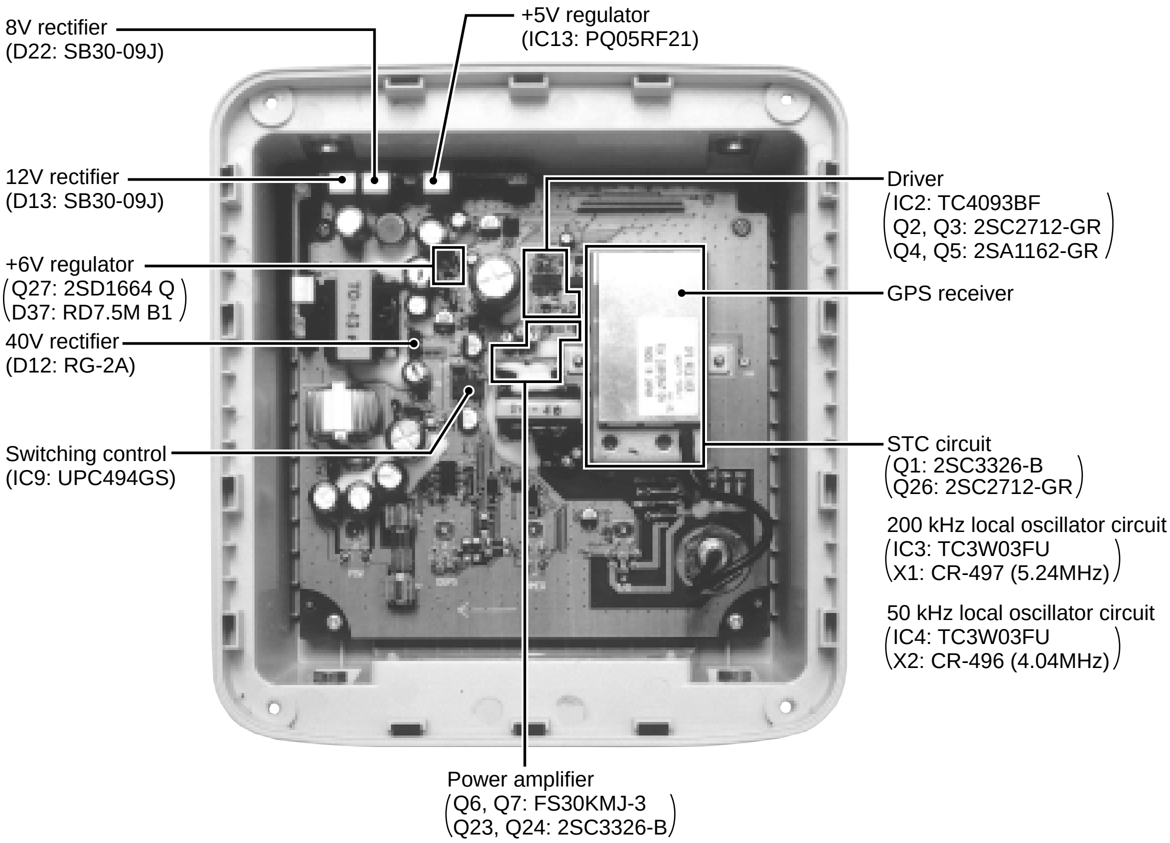
• Intermediate frequency	: 455 kHz
• Sensitivity	: 0.2 µV at 12 dB SINAD
• Sprious response	: 60 dB
• Intermodulation	: 50 dB

All stated specifications are subject to change without notice or obligation.

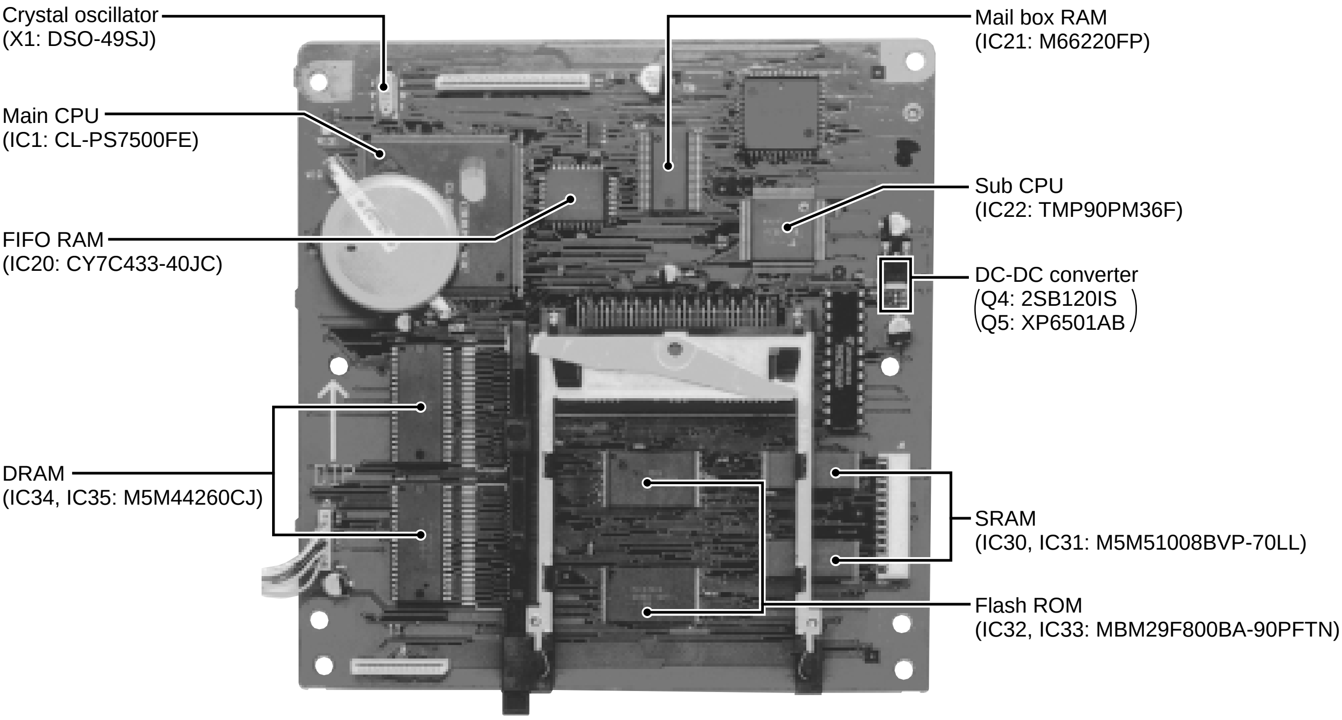
SECTION 2 INSIDE VIEWS

2-1 FP-561

• MAIN UNIT

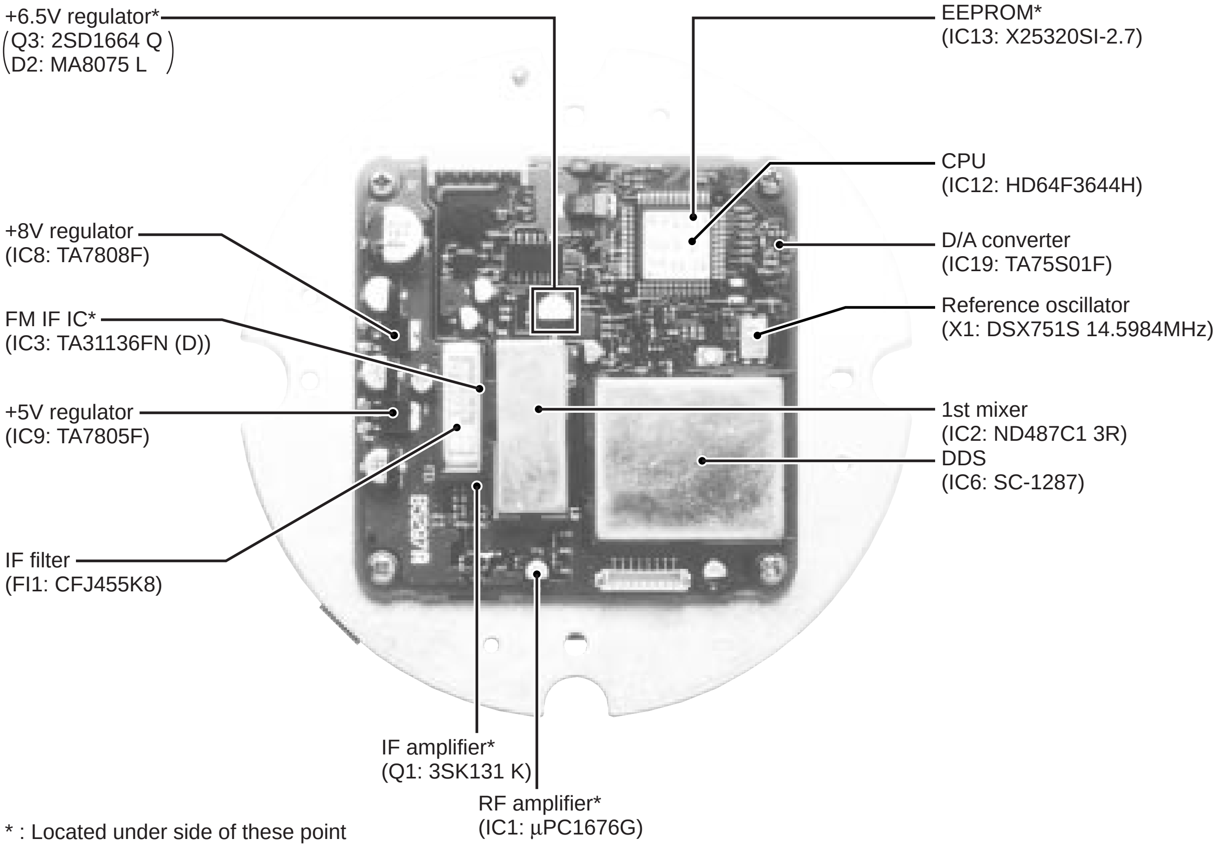


• LOGIC UNIT



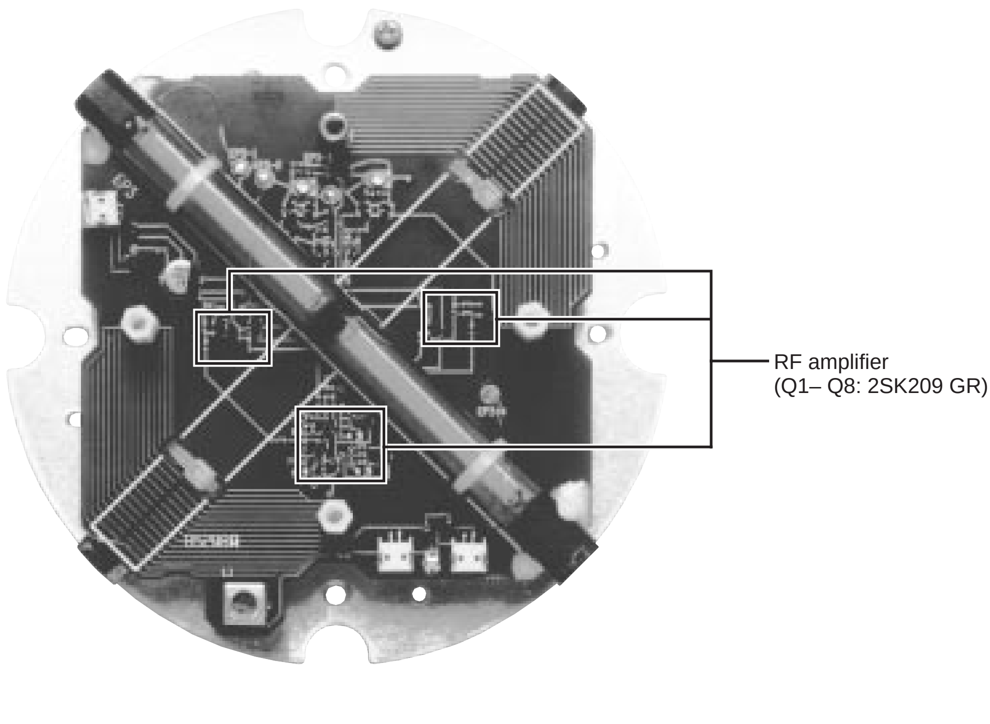
2-2 RD-200

• MAIN UNIT



* : Located under side of these point

• ANT UNIT



SECTION 3 CIRCUIT DESCRIPTION

3-1 TRANSMITTER CIRCUITS

3-1-1 TRANSMIT OUTPUT PULSE CONTROL CIRCUIT

The 200 kHz/50 kHz pulse signals from the LOGIC unit via J1 (pin 3) are passed through the buffer amplifier circuit (IC1, pin 1 and pin 3), and are inverted and output from IC1 (pin 2 and pin 5) as 180˚ phase difference pulse signals.

The signals from the buffer amplifier are passed through the integrate circuits (D1, R2, C3 and D2, R3, C4) which adjust switching time for tuning ON Q6, Q7 separately to prevent overlap of output pulses (200 kHz and 50 kHz). The integrate circuits change the pulse signals which characteristics of 50 % duty-cycle to slow switching time for leading and leave quick switching time for trailing.

The pulse signals are applied to the Schmitt NAND gates (IC2, pins 1 and 5). Also trasmit triger signal from the LOGIC unit is applied to IC2 (pins 2 and 6) via C86. Only when both signals are input, IC2 outputs transmit signals from pin 11 or pin 10.

3-1-2 TRANSMITTER OUTPUT CIRCUIT

The transmitter output circuit consists of the driver and output circuits.

The driver circuit consists of Q2–Q5. The Darlington connection, used for switching circuits, consists of a pair of transistors for Q2 and Q4, and for Q3 and Q5. This is because the next circuit which consists of FETs requires quick switching time for leading and trailing characteristics.

The output circuit consists of Q6, Q7 and T1. When no transmission is occurring, transmit power is charged into C28 and energy outputs at the next moment by turning ON Q6 or Q7.

3-1-3 OUTPUT POWER CIRCUIT

This circuit consists of IC10, Q11, Q12 and Q13. A signal from the LOGIC unit controls voltage to be applied to the primary winding of T1 through these components.

3-1-4 DIODE ISOLATION CIRCUIT

D3, D30, D4, D31, D9, D32, D35, D36 are symmetry-type silicon-varister diodes. Interior connection is simulated as shown in the diagram (Fig.1).

Fig.2 shows the diode's electronic characteristics. When the voltage is +Vd or less, internal resistance is infinitie. This condition is the same as when a diode is OFF. when the voltage exceeds +Vd, internal resistance for each diode is at its minimum level. This condition is the same as when a diode is turned ON.

When transmitting, high voltage is applied to the circuit and when receiving, no voltage is applied. Therefore, the receiver circuit is protected from high power transmit signals when transmitting, and the receiver circuit is isolated from the transmitter circuit when receiving.

3-2 RECEIVER CIRCUITS

3-2-1 RECEIVER MATCHING CIRCUIT

The matching circuits for the 200 kHz signal and for the 50 kHz signal consist of L1, C93 and L6, C96 respectively. The tuned signals at each matching circuit are applied to the analog switch (IC16).

The analog switch (IC6) switches received signals by the Rx frequency control signal (LOCONT) from LOGIC unit via J5 (pin 5), and then outputs to the next stage which is the mixer circuit.

When transmit/receive 200 kHz signal, LOCONT is low level and pin 7 (IC16) is ON. Therefore, IC16 (pin 1) outputs tuned 200 kHz signal.

When transmit/receive 50 kHz signal, LOCONT is high level and pin 6 (IC16) is ON. Therefore, IC16 (pin 1) outputs tuned 50 kHz signal.

• DIODE ISOLATION CIRCUIT

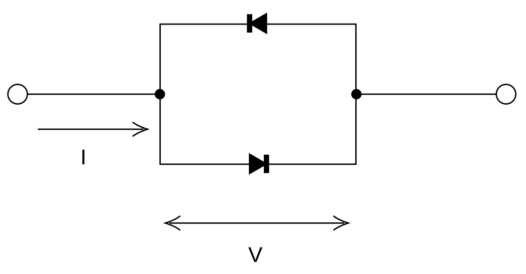


Fig.1

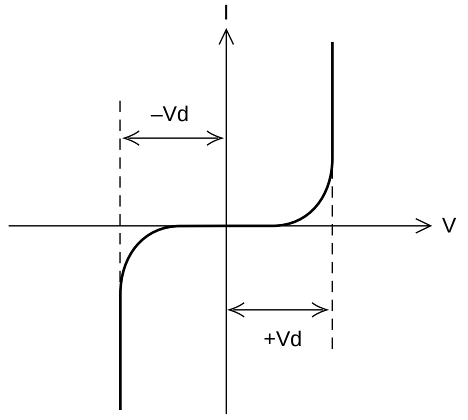


Fig.2

3-2-2 STC CIRCUIT

The STC circuit (Q1, R115, Q26, R116, C102) reduces the sensitivity near-by the dispach line to set the immunity to air bubbles in the sea surfaces so as to improve the image legibility.

When transmitting, the Tx trigger signal (TXTRG) from LOGIC unit via J5 (pin 4) is high level, at this time Q26 is ON and then Q1 turns ON. When switching TX to RX, the Tx trigger signal (TXTRG) becomes low level and Q26 is OFF, and then Q1 turns to OFF slowly by connecting time constant (R116, C102).

Thus the STC function activates.

3-2-3 MIXER AND DETECTOR CIRCUITS

The mixer circuit converts the received signals into the 455 kHz IF signal.

The FM IF IC (IC5) contains the mixer, 455 kHz IF amplifier and RSSI circuits.

The 200 kHz/50 kHz signals from the STC circuit (Q1) are applied to the mixer section of IC5 (pin 16), and are mixed with the 655 kHz/505 kHz LO signals generated at the 200 kHz/50 kHz local oscillator circuits to produce a 455 kHz IF signal.

The 455 kHz IF signal from IC5 (pin 3) passes through the ceramic filter (FI1), where unwanted signals are suppressed, and is then applied to the IF amplifier section in IC5 (pin 5). IC5 (pin 12) outputs RSSI voltage accoding to the input level of IF amplifier section. The RSSI voltage is amplified at the DC amplifier (IC6) to obtain necessary level, and is then applied to the LOGIC unit.

The RSSI control signal from the LOGIC unit via J1 (pin 13) becomes high level when the received signal is deeper than 80 m. Then the signal reduces noise by turning ON Q25 to connect the by-pass capacitor (C90).

3-2-5 LOCAL OSCILLATOR CIRCUITS

200 kHz/50 kHz local oscillator circuits consist of IC3, X1 and IC4, X2 respectively. IC3 or IC4 includes a frequency divider. When high level signal is applied to pin 1, IC3 or IC4 oscillates and divides frequency, when low level signal is applied to pin 1, these IC stop the oscillation.

The local oscillator circuit oscillates a local frequency according to the receive frequency. The oscillator frequency is 655 kHz when the receive frequency is 200 kHz since the equipment IF frequency is 455 kHz. In the same way, when the receive frequency is 50 kHz, the oscillator frequency is 505 kHz.

When Rx frequency switching signal (LOCONT) is low level, IC3 (pin 5) outputs 655 kHz signal. When the line is high level, IC4 (pin 5) outputs 505 kHz signal.

3-3 REGULATOR CIRCUITS

3-3-1 INPUT CIRCUIT

11–30 V DC power is applied to the MAIN unit via the PWR connector (J3) and is then passed through the line filter (L2, C44–C47) to SW unit (via the LOGIC unit). The line filter filters RF signals to prevent their application to the swiching circuit.

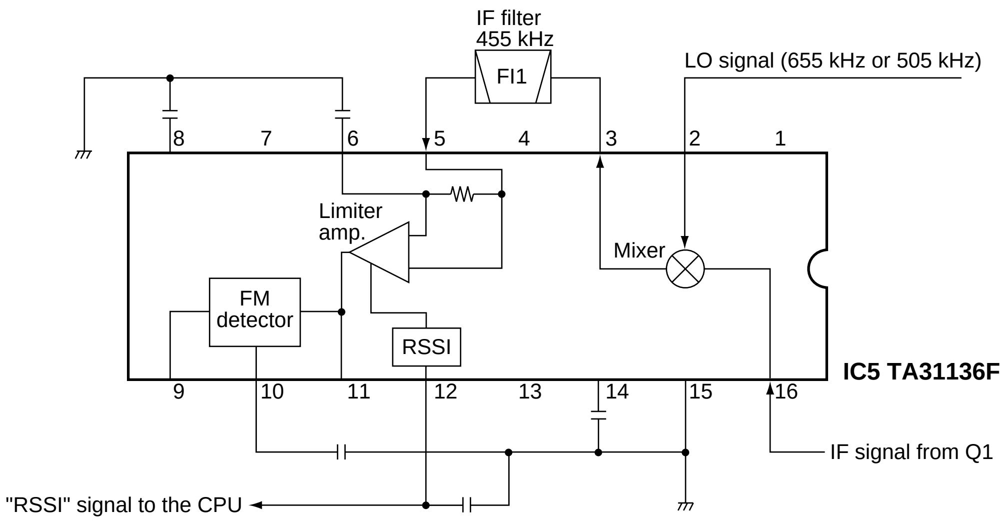
3-3-2 SWITCH CIRCUIT

SW1 and SW2 from MAIN unit are connected to the power switch (S1) on the SW unit passing through the LOGIC unit. When power switch (S1) is turned ON, power voltage is applied to the regulator circuit (MAIN unit; Q12, Q13, D18) and the circuit activates power control circuit (IC9).

3-3-3 SWITCHING CONTROL CIRCUIT

IC9 includes an oscillator circuit and a switching control. The oscillation frequency is 138 kHz and oscillates sawtooth waves. The time constant circuit (R75 and C77) adjusts the oscillation frequency.

• MIXER AND DETECTOR CIRCUITS



3-3-4 SWITCHING CIRCUIT

IC9 (pins 9 and 10) controls the switch circuit (Q14, Q16), and the primary winding of transformer (T2) is alternately connected to and disconnected from the DC power.

3-3-5 RECTIFIER CIRCUIT

The secondary winding of T2 (pin 6, pin 10 and pin 9) output 40 V, 12 V and 8 V (6 V) respectively. 40 V is rectified by D12, C52 and is applied to the transmitter circuits. 12 V is rectified by D13, C53 and is passed through the line filter (L5, C54), and then applied to DISP unit and etc. 8 V is rectified by D22, C69 and is applied to the 3-termianal 5 V regulator (IC13) and 6 V regulator (Q27, D37).

3-3-6 OUTPUT VOLTAGE CONTROL CIRCUIT

8 V output is divided by R64, R65 and is applied to the comparator (IC11, pin 3). The applied voltage is compared with other input (IC11, pin 2). When output voltage of IC11 increases due to increase of the 8 V, a base-current of the photo-coupler (IC10) increases and a corrector–emitter's voltage decreases. At this time, IC9 (pin 2) reduces output voltage and the width of output pulses from pin 9 and pin 10 becomes narrow. And also the interval which Q14 is ON, will be short. Thus the working time of primary winding of transformer (T2) is short, and the outputs of secondary winding of T2 decrease. This feedback circuit controls the constant output voltages even if resistance or input voltage is changed.

3-3-7 LOW VOLTAGE PROTECTION CIRCUIT

Input voltage is divided between R67, R68. The divided voltage is applied to IC9 (pin 15). When the voltage is lower than 9 V, IC9 is turned OFF.

3-4 INTERFACE CIRCUITS

3-4-1 SHIP SPEED INTERFACE CIRCUIT

Ship speed interface circuit consists of IC7, D27. Ship speed sensor generates palse signals according to the rotation of mill wheel in the water. The pulse signals from the ship speed sensor via the J2 (pin 1) are shaped wave form at the Schmitt circuit (IC7a) and applied to the LOGIC unit via J1 (pin 7).

3-4-2 WATER TEMPERATURE INTERFACE CIRCUIT

The resistance from the external thermistor accoding to the water tempereture is input to MAIN unit via J2 (pin 7), and is then applied to the LOGIC unit via J1 (pin 8).

3-4-3 NMEA INTERFACE CIRCUIT

• NMEA INPUT CIRCUIT

NMEA input circuit consists of IC7, IC8. The NMEA signals from external connector (J4, pins 1, 2) are shaped wave form at the Schmitt circuit (IC7b) via the photo-coupler (IC8), and are then applied to the LOGIC unit via J1 (pin 9).

• NMEA OUTPUT CIRCUIT

NMEA output circuit consists of IC17, Q28–Q31. The NMEA signals from the LOGIC unit are input to the MAIN unit via J1 (pin 10). The signals are buffer-amplified and level-shifted at NMEA output circuit, and are then applied to the external connector (J4, pins 3, 4).

3-4-3 DGPS INTERFACE CIRCUIT

• DGPS INPUT CIRCUIT

DGPS input circuit consists of IC7, IC15. The DGPS signals from external connector (J5, pins 4, 5) are passed through the photo-coupler (IC15) and shaped wave form at the Schmitt circuit (IC7c), and are then applied to the LOGIC unit via J1 (pin 11).

• DGPS OUTPUT CIRCUIT

DGPS output circuit consists of IC17, Q32–Q35. The DGPS signals from the LOGIC unit are input to MAIN unit via J1 (pin 12). The signals are buffer-amplified and level-shifted at DGPS output circuit, and are then applied to the external connector (J5, pins 2, 3).

3-5 LOGIC CIRCUITS

3-5-1 CPU AND THE PERIPHERAL CIRCUITS (LOGIC UNIT)

The LOGIC unit consists of ROM, RAM and 2 kind of CPU which are 32 bit ARM RISC micro-controller and 8 bit micro-controller. CPUs and a control circuit control all functions. The interrupt signal functions in the following way:

• MAIN CPU (IC1)

The main CPU (IC1) is a 32 bit RISC CPU and acts as a computer circuit to control all functions and to respond to all kind of interruptions. The main CPU uses a 32 MHz clock signal from X1.

The main CPU (IC1) generates an address signal and an RGB signal corresponding to display coordinates and the address of DRAM. This IC chip also generates vertical signals and synchronicity signals for the LCD

• SUB CPU (IC22)

The sub CPU controls the LCD brightness, ship speed, keyboard, sounder and serial communication from the GPS, DGPS, NMEA. The sub CPU uses a RESET signal and 16 MHz clock signal from main CPU (IC1).

• RAM (IC20, IC21)

IC20 is a 4k×9 bit FIFO RAM which buffer strage for sending received sounder signal from the sub CPU (IC22) to main CPU (IC1).

IC21 is a 256×8 bit mail-box RAM which communicates GPS data or keyboard data between the main CPU (IC1) and sub CPU (IC22).

• ROM (IC32, IC33)

IC32 and IC33 are 8 Mbit flash ROMs. ROM contains a system operating program and data of world map.

• ADDRESS DECODER (IC28)

IC28 is a PLD (programmable logic device) which is address decoder and controller of the card-data reader, and outputs chip select signal to IC1 and I/O peripheral signals.

• SRAM (IC30, IC31)

IC30 and IC31 are 1 Mbit SRAMs which backuped by the memory battery (BT1).

• DRAM (IC34, IC35)

IC34, IC35 are DRAMs and are used for video RAMs. Each chip has a capacity of 4 Mbits.

3-6 DGPS RECEIVER (RD-200)

3-6-1 ANTENNA CIRCUIT (ANT UNIT)

EP3 and EP4 consist of 2 series of antennas respectively (total 4 series).

The received signal from the antenna (EP3) is tuned at C3, and is amplified at the RF amplifier circuits (Q1, Q2, Q5, Q6).

On the other hand, the received signal from another antenna (EP4) which falls at right angle with EP3, is tuned at C4. The tuned signal is amplified at the RF amplifier circuits (Q3, Q4, Q7, Q8).

The both amplified signals are piled up and are impedance-matched to 50 Ω at L1, and are then applied to the MAIN unit via J1.

3-6-2 RF AMPLIFIER CIRCUIT (MAIN UNIT)

The RF circuit amplifies signals within the range of frequency coverage and filters out-of-band signals.

The signals from the ANT unit via J1 (pin 2) pass through the low-pass filter (L2, L3, C3–C7) and high-pass filter (L4, C8–C10). The filtered signals are amplified at the RF amplifier (IC1) and are then enter another low-pass filter (L6, L7, C15–C19) and notch filter (L24, L25, C111, C112) to suppress unwanted signals. The filtered signals are applied to the mixer circuit.

3-6-3 MIXER CIRCUIT (MAIN UNIT)

The mixer circuit (IC2, L8, L9) is a double-balanced mixer which converts the received signal to a fixed frequency of the IF signal with an LO frequency.

The signals from the RF circuit are mixed with the LO signal at the mixer circuit (IC2, L8, L9) to produce a 455 kHz IF signal.

3-6-4 IF CIRCUIT (MAIN UNIT)

By changing the LO frequency, only the desired frequency will pass through the IF filter at the next stage of the mixer.

The IF signal from the mixer circuit is amplified at the IF amplifier (Q1) and is applied to a ceramic filter (FI1) to suppress out-of-band signals. The filtered signal is applied to the FM IF IC circuit (IC3).

3-6-5 DEMODULATOR CIRCUIT (MAIN UNIT)

The FM IF IC (IC3) contains the limiter amplifier, detector circuits, etc.

The IF signal from the IF filter is applied to the limitter amplifier section of IC3 (pin 5). The amplified signal is mixed with a 456.2 kHz signal from CPU IC (IC12) to produce a 1.2 kHz detector signal for demodulation the IF signal into AF signals.

AF signal from FM IF IC (IC3, pin 9) passes through the low-pass filter (IC4a, IC4b). The filtered signal is amplified at the AF amplifier (Q4) and is applied to the CPU (IC12).

3-6-6 REFERENCE OSCILLATOR CIRCUIT (MAIN UNIT)

The reference oscillator circuit generates the reference frequency, and the signals are applied to the DDS IC and CPU.

The generated reference signal from the reference oscillator (X1: 14.5984 MHz) is amplified and divided at the buffer amplifier (IC7). The divided signal (7.2992 MHz) is applied to the DDS IC (IC6) and CPU (IC12) via the amplifiers IC5, IC10 respectively.

3-6-7 LO CIRCUIT (MAIN UNIT)

The LO circuit generates the LO frequency, and the signals are applied to the mixer circuit.

The generated LO signal is output from IC6 and passed through the D/A converter (R26–R45), low-pass filter (L15, L16, C55–C59) and high-pass filter (L17, C60–C62). The filtered signal is amplified at the buffer amplifier (Q2) and then is passed through the low-pass filter (L18, L19, C65–C69). The filtered signal is applied to the mixer circuit.

3-7 PORT ALLOCATIONS

3-7-1 FP-561

• SUB CPU (LOGIC UNIT; IC22)

Pin number	Port name	Description
1	TXSIG	Outputs Tx (50 kHz/200 kHz) pulse signals to IC1 (pins 1, 3).
3	INV	Outputs control signal for LCD backlight.
4	CONT	Outputs control signal for the LCD contrast
7	RSSI	A/D input port for the received signal strength indicator voltage.
16	GPSI	Input port for serial signal from the GPS unit via the buffer amplifier (IC23, pin 12).
17	GPSO	Outputs serial signal to the buffer amplifier (IC23, pin 3) for the GPS unit.
18	NMEAI	Input port for serial signal from the NMEA/DGPS units via the analog switch (IC41, pin 14).
20	NMO	Outputs serial signal to the analog switch (IC41, pin 2) for the NMEA/DGPS units.
72	SPD	Ship speed input port from the photo coupler (IC7, pin 7) on the MAIN unit.
74	BEEP	Outputs beep audio to the buzzer circuit (Q4, SP1) on the SW unit.
77	LOC	Outputs receive frequency switching signal for the analog switch (IC16).
80	TXTRG	Outputs trasmit triger signal for the driver circuit (IC2, pins 2, 6) on the MAIN unit.

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• MAIN CPU (LOGIC UNIT; IC1)

Pin number	Port name	Description
73	DTCK	Outputs serial clock signal for the LCD.
86	VSYNC	Outputs vertical synchronizing signal for LCD.
88	HSYNC	Outputs horizintal synchronizing signal for LCD.
92	RED	Outputs red color signal for LCD.
93	BLUE	Outputs blue color signal for LCD.
94	GREEN	Outputs green color signal for LCD.
172	DEPCONT	Outputs RX pass-bandwidth control signal for the RSSI controller (Q25). High : While narrow

3-7-2 RD-200

• CPU (MAIN unit; IC12)

Pin number	Port name	Description
10	RESET	Input port for the reset signal from the reset circuit (IC11, Q5).
25–32	TUNE0–TUNE7	8 bit D/A output ports for the bar antennas control signals.
39	DRES	Outputs reset signal for the DDS IC (IC6).
40	CLK	Outputs serial clock signal for the DDS IC (IC6).
41	DATA	Outputs serial data signals for the DDS IC (IC6).
42	STRB	Outputs strobe signals for the DDS IC (IC6).
43	ESCK	Outputs clock signal for the EEPROM IC (IC13).
44	ESIO	Inputs/outputs serial signal for the EEPROM IC (IC13).
45	ECS	Outputs chip select signal for the EEPROM IC (IC13).
48	RXDO	Input port for NMEA signal or clone signal from the NMEA connector (J3).
49	TXDO	Outputs NMEA signal to the NMEA connector (J3).

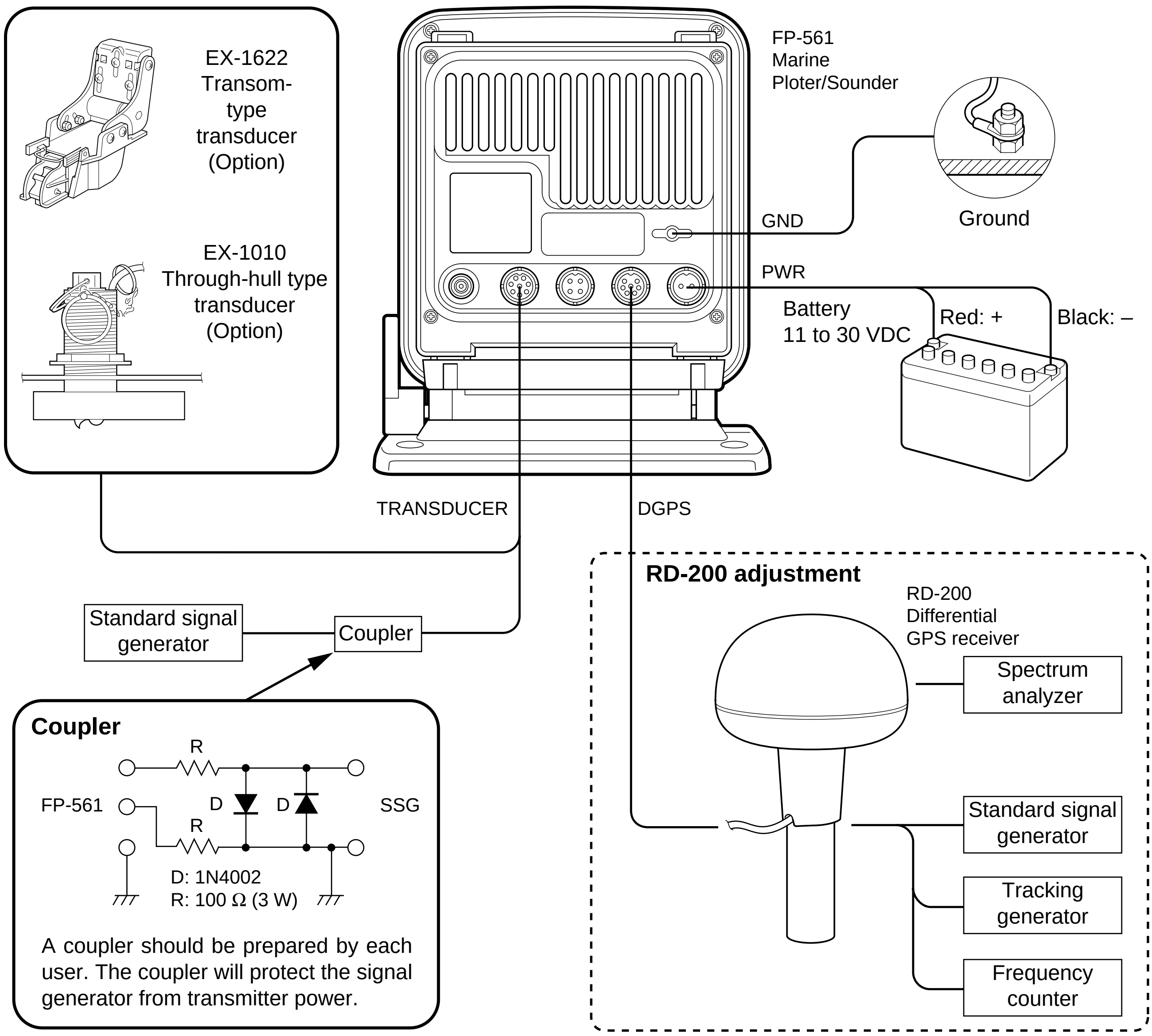
SECTION 4 ADJUSTMENT PROCEDURES

4-1 PREPARATION

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 11–30 V DC Current capacity : 3 A or more	Oscilloscope	Frequency range : DC–20 MHz Measuring range : 0.01–10 V
Frequency counter	Frequency range : 0.1–10 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	Tracking generator	Frequency range : 100 kHz–100 MHz Output level : 1 mV to 71 mV (–47 dBm to –10 dBm)
DC voltmeter	Input impedance : 50 kΩ/V DC or better	Standard signal generator (SSG)	Frequency range : 10 kHz–100 MHz Output level : 0.1 µV–32 mV (–127 to –17 dBm)
Spectrum analyzer	Frequency range : At least 10 MHz Spectrum bandwidth : ±100 kHz or more		

■ CONNECTION



4-2 FP-561 TRANSMITTER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
OUTPUT POWER	1	• Connect a transducer to the [TRANSDUCER] connector. • Mode : [SOUNDER] • Frequency : [H] • Depth range : 640 m	MAIN	Connect an oscilloscope between pin 3 and pin 5 of J2.	880–1320 Vp-p at maximum wave point		Verify
	2	• Frequency : [L]					Verify

4-3 FP-561 RECEIVER ADJUSTMENT

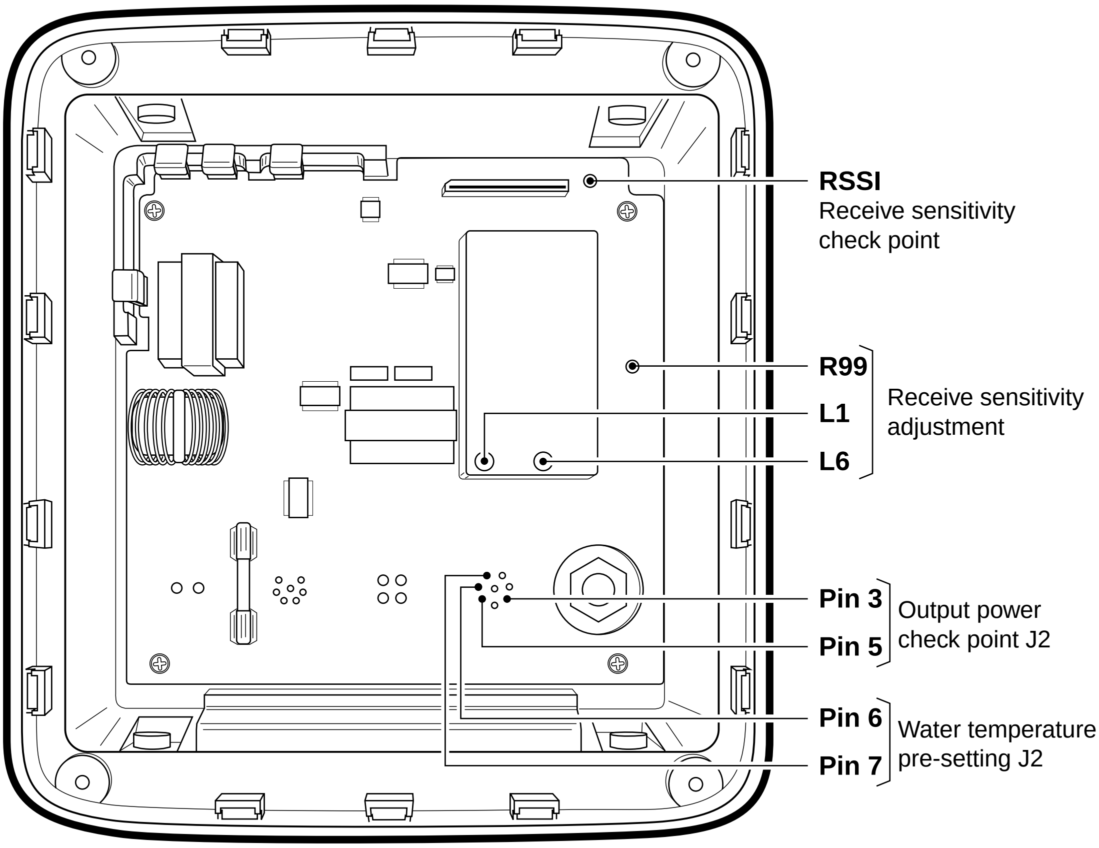
ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
RECEIVE SENSITIVITY	1	• Mode : [SOUNDER] • Frequency : [H] • Depth range : 5 m • STC : [1] • Connect a standard signal generator to the [TRANSDUCER] connector J2 via the coupler and set as: Fequency : 200 kHz Level : 1 mV (–47 dBm)	MAIN	Connect a DC voltmeter or oscilloscope to the check point "RSSI".	Maximum DC voltage	MAIN	L1
	2	• Frequency : [L] • Set an SSG as : Frequency : 50 kHz Level : 1 mV (–47 dBm)					L6
	3	• Set an SSG as : Frequency : 50 kHz Level : 100 mV (–7 dBm)					R99

*This output level of the standard signal generator (SSG) is indicated as SSG's open circuit.

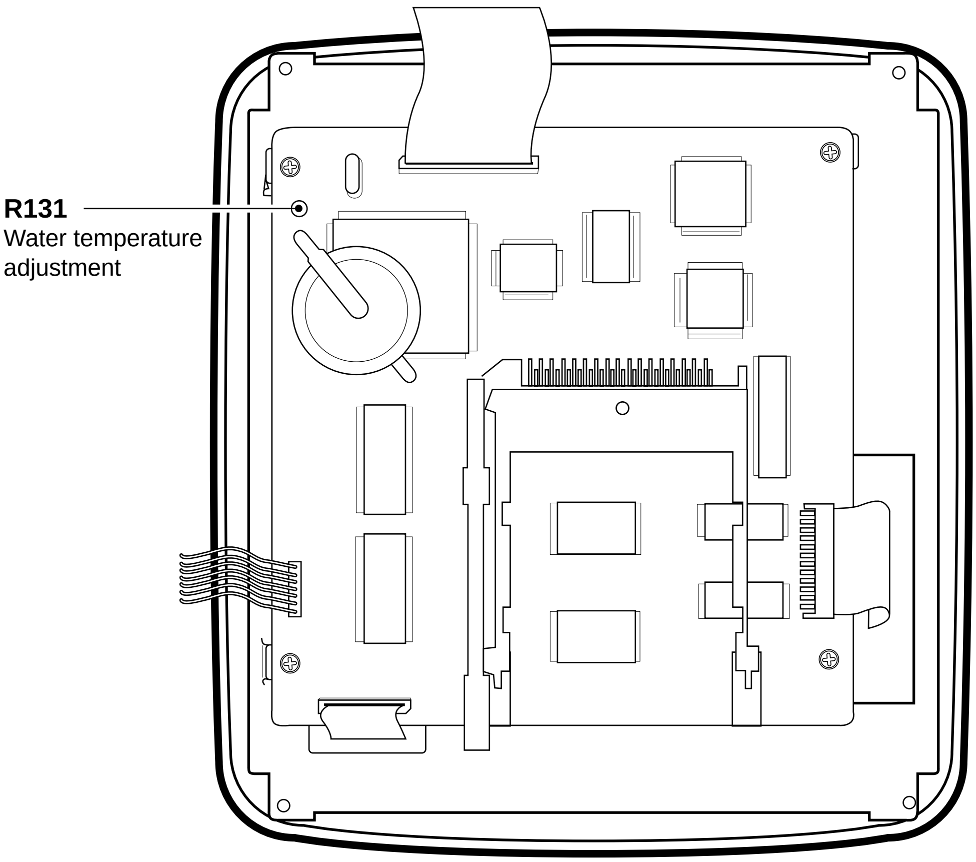
4-4 FP-561 WATER TEMPERTURE ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
WATER TEMPERATURE	1	• Connect a 10 kΩ resistor between pin 6 and pin 7 of the [TRANSDUCER] connector J2.	Display		25.0 ˚C	LOGIC	R131

• **MAIN unit**



• **LOGIC unit**

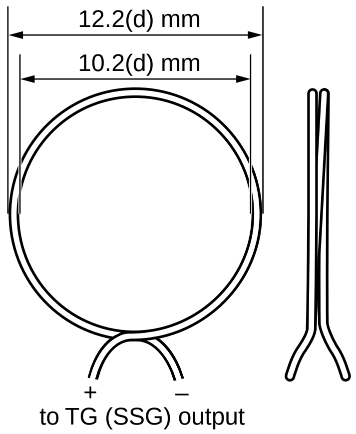


4-5 RD-200 ADJUSTMENTS

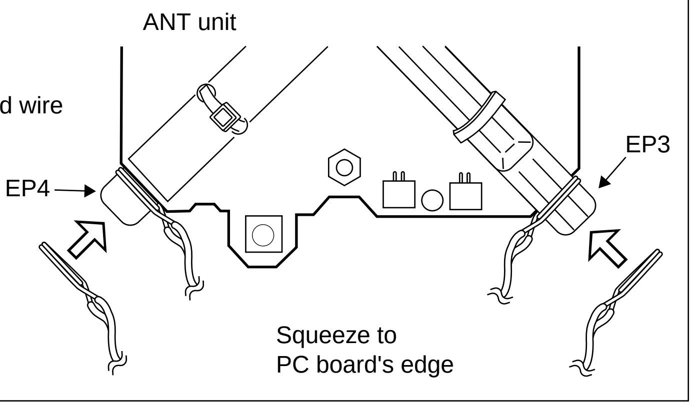
ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
REFERENCE FREQUENCY	1	• Connect the antenna connector to the FP-561's DGPS connector and turn FP-561 power ON.	MAIN	Connect a frequency counter to the check point "CP1".	7.29920 MHz	MAIN	C71
RECEIVE SENSITIVITY	1	• Set the connected FP-561 as: Baud rate : 200 Fequency : 300.0 kHz • Connect a standard signal generator to J4 on the ANT unit and set as: Fequency : 300.0 kHz Modulation : OFF	ANT	Connect a SINAD meter to J3.	25 % distortion	SSG	Verify the SSG level less than 0.2 µV (–121 dBm)
DECODE	1	• Set the connected FP-561 as: Baud rate : 200 Fequency : 300.0 kHz • Connect a standard signal generator to J4 on the ANT unit and set as: Fequency : 250.0 kHz Level : 1 mV (–47 dBm) Modulation : OFF	MAIN	Connect a DC voltmeter or oscilloscope to the check point "CP2".	High level (5 V)		Verify
	2	• Set an SSG as : Frequency : 350.0 kHz			Low level (0 V)		Verify
ANTENNA (EP3)	1	• Set the connected FP-561 as: Baud rate : 200 Fequency : 300.0 kHz • Remove solder at CP1 on the ANT unit.	ANT	Connect a spectrum analyzer to J5.	TG Peak point to 300 kHz SSG Maximum RF level	ANT	C3
	2	• Conncet a traking generator (or SSG) to the EP3 on the ANT unit using the probe JIG and set as: Level : 7.1 mV (–30 dBm) Frequency : 300.0 kHz (SSG only)			–40 dBm or more		Verify
(EP4)	3	• Conncet a TG (or SSG) to the EP4 on the ANT unit using the probe Jig and set as: Level : 7.1 mV (–30 dBm) Frequency : 300.0 kHz (SSG only)			TG Peak point to 300 kHz SSG Maximum RF level		C4
	4				–40 dBm or more		Verify
		After adjustment, re-solder CP1 on the ANT unit.					

*This output level of the standard signal generator (SSG) is indicated as SSG's open circuit.

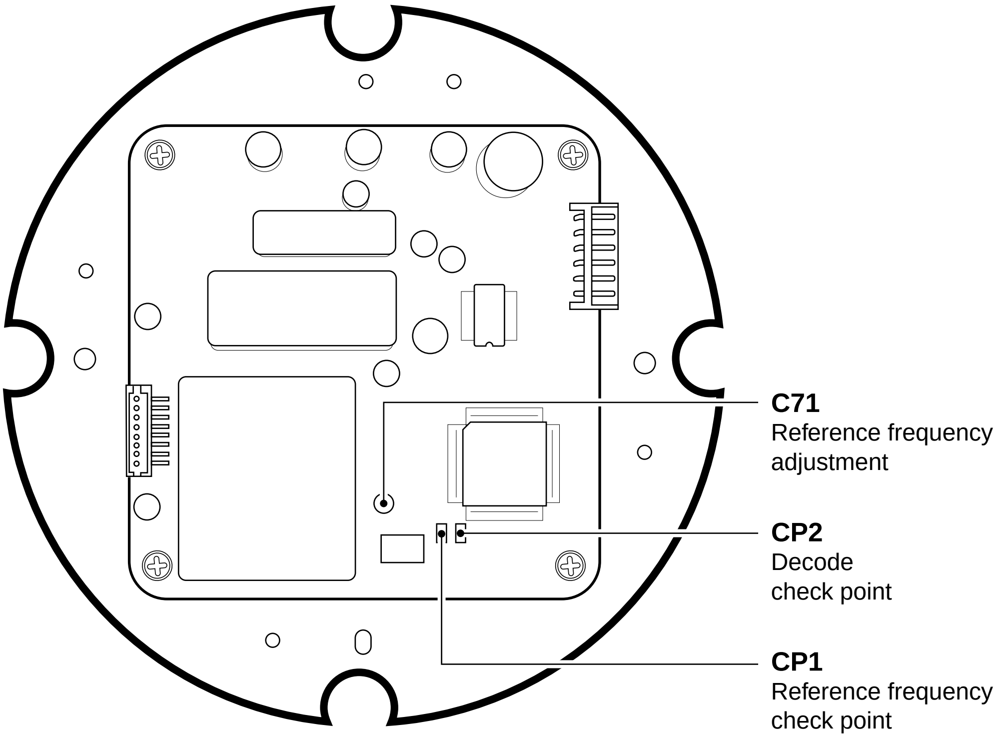
• Probe JIG



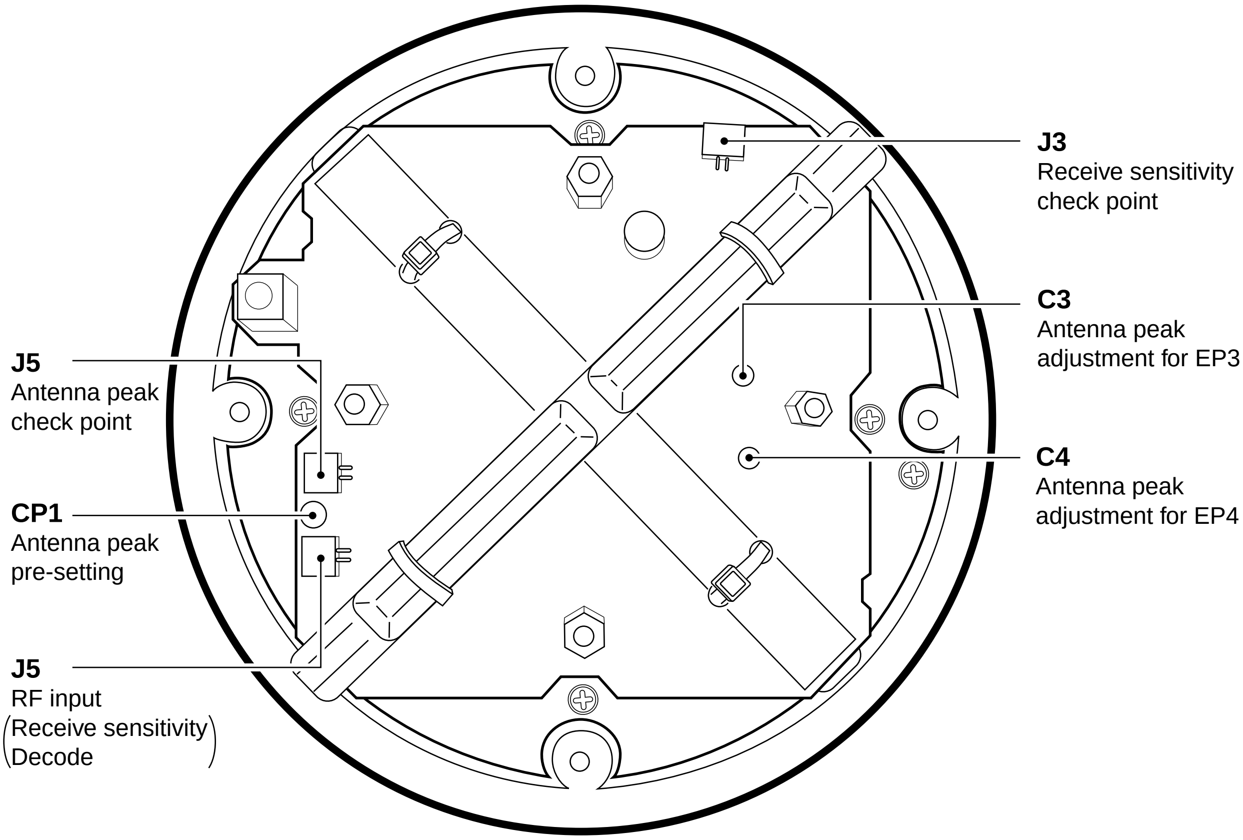
Wire description
Kind : enamelled wire
Diameter : 1.0 mm
Roll number : 2 roll



• **MAIN unit**



• **ANT unit**



SECTION 5 PARTS LIST

5-1 FP-561

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
IC1	1130005720	S.IC	TC7W04F (TE12L)
IC2	1130006370	S.IC	TC4093BF
IC3	1130007990	S.IC	TC3W03FU (TE12L)
IC4	1130007990	S.IC	TC3W03FU (TE12L)
IC5	1110003490	S.IC	TA31136FN (D,EL)
IC6	1110003340	S.IC	µPC358GR-T1
IC7	1130007420	S.IC	TC7W14FU (TE12L)
IC8	1170000280	S.IC	TLP121 (GB-TPL)
IC9	1110003070	S.IC	µPC494GS
IC10	1170000280	S.IC	TLP121 (GB-TPL)
IC11	1110002700	S.IC	NJM2904M-T1
IC13	1180001840	IC	PQ05RF21
IC14	1130003920	S.IC	TC4S69F (TE85R)
IC15	1170000280	S.IC	TLP121 (GB-TPL)
IC16	1130006220	S.IC	TC4W53FU (TE12L)
IC17	1130009480	S.IC	TC4049BF (N)
Q1	1530002550	S.TRANSISTOR	2SC3326-B (TE85R)
Q2	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q3	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q4	1510000500	S.TRANSISTOR	2SA1162-GR (TE85R)
Q5	1510000500	S.TRANSISTOR	2SA1162-GR (TE85R)
Q6	1590002670	FET	FS30KMJ-3
Q7	1590002670	FET	FS30KMJ-3
Q12	1510000800	S.TRANSISTOR	2SA1213-Y (TE12R,C)
Q13	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q14	1590002670	FET	FS30KMJ-3
Q16	1510000500	S.TRANSISTOR	2SA1162-GR (TE85R)
Q22	1590000430	S.TRANSISTOR	DTC144EUA T106
Q23	1530002550	S.TRANSISTOR	2SC3326-B (TE85R)
Q24	1530002550	S.TRANSISTOR	2SC3326-B (TE85R)
Q25	1530002550	S.TRANSISTOR	2SC3326-B (TE85R)
Q26	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q27	1540000550	S.TRANSISTOR	2SD1664 T100Q
Q28	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q29	1510000510	S.TRANSISTOR	2SA1576A T106R
Q30	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q31	1510000510	S.TRANSISTOR	2SA1576A T106R
Q32	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q33	1510000510	S.TRANSISTOR	2SA1576A T106R
Q34	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q35	1510000510	S.TRANSISTOR	2SA1576A T106R
D1	1750000550	S.DIODE	1SS355 TE-17
D2	1750000550	S.DIODE	1SS355 TE-17
D3	1710000350	DIODE	1N4002
D4	1710000350	DIODE	1N4002
D9	1710000350	DIODE	1N4002
D10	1790000700	DIODE	DSA3A1
D11	1710000350	DIODE	1N4002
D12	1790000760	DIODE	RG-2A
D13	1790001630	DIODE	SB30-09J
D14	1750000550	S.DIODE	1SS355 TE-17
D17	1710000350	DIODE	1N4002
D18	1730000880	S.ZENER	RD11M-T2B2
D21	1750000550	S.DIODE	1SS355 TE-17
D22	1790001630	DIODE	SB30-09J
D23	1750000550	S.DIODE	1SS355 TE-17
D24	1750000550	S.DIODE	1SS355 TE-17
D27	1750000130	S.DIODE	DA204U T107
D28	1750000550	S.DIODE	1SS355 TE-17
D30	1710000350	DIODE	1N4002
D31	1710000350	DIODE	1N4002
D32	1710000350	DIODE	1N4002
D33	1730000010	S.ZENER	RD4.7M-T2B3
D34	1730000010	S.ZENER	RD4.7M-T2B3
D35	1710000350	DIODE	1N4002
D36	1710000350	DIODE	1N4002
D37	1730000770	S.ZENER	RD7.5M-T1B1
FI1	2020001640	CERAMIC	CFWS455GY

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
X1	6050009190	XTAL	CR-497 (5.24 MHz)
X2	6050009180	XTAL	CR-496 (4.04 MHz)
L1	6150003680	COIL	LS-415
L2	5920000450	COIL	FK-080E-1020
L3	6200009060	S.COIL	LQH 3C 101K 34
L5	6170000150	COIL	LW-16
L6	6150003670	COIL	LS-414
L7	6200003240	S.COIL	NL 322522T-221J
L8	6200008670	S.COIL	D10F-A814AY-152K
R2	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R3	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R5	7070001040	RESISTOR	ERG1SJ 472 (4.7 kΩ)
R6	7070001040	RESISTOR	ERG1SJ 472 (4.7 kΩ)
R7	7070000641	RESISTOR	ERG2SJ 471 (470 Ω)
R8	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R9	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R10	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R12	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R13	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R15	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R16	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R17	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R18	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R19	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R22	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R23	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R24	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R25	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R26	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R27	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R28	7030000190	S.RESISTOR	MCR10EZHJ 27 Ω (270)
R29	7030000190	S.RESISTOR	MCR10EZHJ 27 Ω (270)
R35	7030000340	S.RESISTOR	MCR10EZHJ 470 Ω (471)
R36	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R44	7030006520	S.RESISTOR	RR0816P-561-D (560 Ω)
R45	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R46	7540000060	ABSORBER	ERZ-C05DK 560
R47	7030000470	S.RESISTOR	MCR10EZHJ 5.6 kΩ
R48	7030001430	S.RESISTOR	MCR50JZHJ 27 kΩ
R55	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R56	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R60	7030000980	S.RESISTOR	MCR50JZHJ 5.6 Ω (5R6)
R61	7030000310	S.RESISTOR	MCR10EZHJ 270 Ω (271)
R62	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R63	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R64	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R65	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R66	7030000500	S.RESISTOR	MCR10EZHJ 10 kΩ
R67	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R68	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R69	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R70	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R71	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R72	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R74	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R75	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R76	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R77	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R78	7030000410	S.RESISTOR	MCR10EZHJ 1.8 kΩ
R79	7030000170	S.RESISTOR	MCR10EZHJ 18 Ω (180)
R82	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R84	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R85	7070000641	RESISTOR	ERG2SJ 471 (470 Ω)
R91	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R92	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R93	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R94	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R96	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R97	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R98	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)

S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R99	7310003580	S.TRIMMER	EVM-1XSX50 B15 (104)
R100	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R101	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R102	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R103	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R104	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R105	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R106	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R107	7070000641	RESISTOR	ERG2SJ 471 (470 Ω)
R108	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R109	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R110	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R111	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R112	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R113	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R115	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R116	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R117	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R118	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R119	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R120	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R122	7030001090	S.RESISTOR	MCR50JZHJ 47 Ω (470)
R124	7030001090	S.RESISTOR	MCR50JZHJ 47 Ω (470)
R125	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R127	7030001090	S.RESISTOR	MCR50JZHJ 47 Ω (470)
R128	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R130	7030001090	S.RESISTOR	MCR50JZHJ 47 Ω (470)
R131	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
C1	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C3	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C4	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C5	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C7	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C8	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C10	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C11	4030009990	S.CERAMIC	C1608 CH 1H 200J-T-A
C12	4030009990	S.CERAMIC	C1608 CH 1H 200J-T-A
C13	4030009990	S.CERAMIC	C1608 CH 1H 200J-T-A
C14	4030009990	S.CERAMIC	C1608 CH 1H 200J-T-A
C16	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C17	4550006250	S.TANTALUM	TEMSVA 1A 106M-8L
C18	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C19	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C20	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C21	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C22	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C23	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C24	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C25	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C28	4510007030	ELECTROLYTIC	63 MV 1000CZ
C40	4510005310	S.ELECTROLYTIC	ECEV1CA220SR
C41	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C42	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C43	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C44	4510007020	ELECTROLYTIC	35 MV 1000GX
C45	4030004740	S.CERAMIC	C2012 JB 1H 472K-T-A
C46	4030004740	S.CERAMIC	C2012 JB 1H 472K-T-A
C47	4510007020	ELECTROLYTIC	35 MV 1000GX
C48	4030004740	S.CERAMIC	C2012 JB 1H 472K-T-A
C49	4030004740	S.CERAMIC	C2012 JB 1H 472K-T-A
C50	4310000360	MYLAR	50 F2D 103J
C52	4510006880	ELECTROLYTIC	100 MV 33 CZ
C53	4510007010	ELECTROLYTIC	16 MV 1000GX
C54	4510006640	ELECTROLYTIC	16 MV 1000 CZ
C59	4510004940	ELECTROLYTIC	50 MV 33 NPDW
C60	4510004940	ELECTROLYTIC	50 MV 33 NPDW
C61	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C62	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C63	4510004640	S.ELECTROLYTIC	ECEV1CA470SP
C64	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C69	4510007000	ELECTROLYTIC	10 MV 1000GX
C70	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C71	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C72	4510005940	ELECTROLYTIC	10 MV 470 HC
C73	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C74	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C75	4510005750	S.ELECTROLYTIC	ECEV1EA220SP
C76	4510004640	S.ELECTROLYTIC	ECEV1CA470SP
C77	4310000570	MYLAR	50 F2D 222J
C79	4510004640	S.ELECTROLYTIC	ECEV1CA470SP

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
C80	4510004560	ELECTROLYTIC	50 MV 10 NPDW
C81	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C83	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C85	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C86	4510004910	ELECTROLYTIC	16 MV 10 SWN
C88	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C89	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C90	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C91	4010008470	CERAMIC	DE0905 B 222K 1KV
C92	4010008470	CERAMIC	DE0905 B 222K 1KV
C93	4030010240	S.CERAMIC	C1608 JB 1H 391K-T-A
C94	4010008470	CERAMIC	DE0905 B 222K 1KV
C95	4010008470	CERAMIC	DE0905 B 222K 1KV
C96	4030008470	S.CERAMIC	C1608 JB 1H 272K-T-A
C97	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C98	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C99	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C100	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C101	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C102	4550003080	S.TANTALUM	TEMSVA 1A 335M-8L
C103	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C104	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C105	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C106	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C107	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C108	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C109	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C110	4550006250	S.TANTALUM	TEMSVA 1A 106M-8L
C111	4030006480	S.CERAMIC	GRM42-6 B 104K 50PT
C113	4030006480	S.CERAMIC	GRM42-6 B 104K 50PT
C115	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C116	4030011280	S.CERAMIC	C1608 CH 1H 271J-T-A
C117	4030011280	S.CERAMIC	C1608 CH 1H 271J-T-A
C118	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C119	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C120	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C121	4030011330	S.CERAMIC	C1608 CH 1H 391J-T-A
C122	4030011330	S.CERAMIC	C1608 CH 1H 391J-T-A
J1	6510021040	CONNECTOR	52806-3010
J2	6510021220	CONNECTOR	8S-S-E-SS
J3	6510021190	CONNECTOR	2S-S-E-SS
J4	6510021200	CONNECTOR	4S-S-E-SS
J5	6510021210	CONNECTOR	7S-S-E-SS
F1	5210000060	FUSE	FGB 5A
F2	5220000020	HOLDER	S-N5051
F3	5220000020	HOLDER	S-N5051
T1	5920000730	TRANSFORMER	TO-46
T2	5920000690	TRANSFORMER	TO-43
EP1	0910051392	PCB	B 5305B
EP2	0850000120	UNIT BOARD	IA023-5B03S

S.=Surface mount

[LOGIC UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
IC1	1140007500	S.IC	CL-PS7500FE-QC-A
IC2	1130009170	S.IC	TC74HCT245AF
IC3	1130009170	S.IC	TC74HCT245AF
IC4	1130005440	S.IC	TC74HC245AF
IC5	1130005440	S.IC	TC74HC245AF
IC6	1130005440	S.IC	TC74HC245AF
IC7	1130009390	IC	TC74HCT646AP
IC13	1110003500	S.IC	S-80742SL-A6-T1
IC16	1130005340	S.IC	TC74HC139AF
IC18	1130005480	S.IC	TC74HC573AF
IC19	1130007040	S.IC	TC7W32F (TE12L)
IC20	1130009080	S.IC	CY7C433-40JC
IC21	1140007540	S.IC	M66220FP
IC22	1140007510	S.IC	TMP90PM36F
IC23	1130005290	S.IC	TC74HC14AF
IC28	1140007820	S.IC	SC-1372 (MACH111-15JC)
IC30	1130009050	S.IC	M5M51008BVP-70LL
IC31	1130009050	S.IC	M5M51008BVP-70LL
IC32	1130009060	S.IC	MBM29F800BA-90PFTN
IC33	1130009060	S.IC	MBM29F800BA-90PFTN
IC34	1140007570	S.IC	M5M44260CJ
IC35	1140007570	S.IC	M5M44260CJ
IC41	1130007680	S.IC	BU4053BCF-T1
IC42	1130005290	S.IC	TC74HC14AF
IC44	1130008040	S.IC	TC7SH04FU
IC45	1130005741	S.IC	TC74AC74F (TP1)
IC46	1130008040	S.IC	TC7SH04FU
Q1	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q3	1520000450	S.TRANSISTOR	2SB1132 T100 Q
Q4	1520000650	S.TRANSISTOR	2SB1201-S-TL
Q5	1590001190	S.TRANSISTOR	XP6501-(TX) .AB
D1	1750000060	S.DIODE	1SS196 (TE85R)
D2	1750000020	S.DIODE	1SS184 (TE85R)
X1	6050010460	S.XTAL	DSO-49SJ (32.000 MHz)
R1	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R2	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R3	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R4	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R5	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R6	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R7	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R8	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R9	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R10	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R11	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R12	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R13	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R14	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R15	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R16	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R17	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R18	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R19	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R20	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R21	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R22	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R23	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R24	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R25	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R26	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R27	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R28	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R29	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R30	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R31	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R32	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R36	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R37	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R38	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R39	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R40	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R41	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R42	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R43	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R44	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R45	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)

[LOGIC UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R46	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R47	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R48	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R49	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R51	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R52	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R53	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R55	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R56	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R60	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R62	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R68	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R71	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R77	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R78	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R81	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R82	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R83	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R85	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R86	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R87	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R88	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R89	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R90	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R91	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R92	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R93	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R94	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R95	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R96	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R97	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R98	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R99	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R100	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R101	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R102	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R104	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R105	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R106	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R107	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R108	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R109	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R110	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R111	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R112	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R126	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R127	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R128	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R129	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R130	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R131	7310003610	S.TRIMMER	EVM-1XSX50 B14 (103)
R132	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R133	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R134	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R135	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R136	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R138	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R140	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R142	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R143	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R144	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R145	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R146	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R147	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R148	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R150	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R151	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R155	7030006600	S.RESISTOR	RR0816P-822-D (8.2 kΩ)
R156	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R162	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R163	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R164	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R165	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R167	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R168	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R169	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R170	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R171	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R172	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R173	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R174	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R177	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)

S.=Surface mount

[LOGIC UNIT]

REF NO.	ORDER NO.	DESCRIPTION		
R178	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)	
R179	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)	
R180	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)	
C1	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A	
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C3	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C4	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C5	4510004650	S.ELECTROLYTIC	ECEV1EA4R7SR	
C6	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C7	4510004630	S.ELECTROLYTIC	ECEV1CA100SR	
C10	4510005310	S.ELECTROLYTIC	ECEV1CA220SR	
C11	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C12	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C13	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C14	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C15	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C16	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C17	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C18	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C19	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C20	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C21	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C22	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C23	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C24	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C25	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C26	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C27	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C42	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C43	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C44	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C45	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C46	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C47	4510004640	S.ELECTROLYTIC	ECEV1CA470SP	
C48	4510006650	S.ELECTROLYTIC	ECEV1EA100SR	
C49	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C50	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C51	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C52	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C53	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C54	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C55	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C56	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C58	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C59	4550000460	S.TANTALUM	TESVA 1C 105M1-8L	
C61	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C64	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C65	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C66	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C67	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C68	4510005310	S.ELECTROLYTIC	ECEV1CA220SR	
C69	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C70	4030011810	S.CERAMIC	C1608 JB 1A 224K-T-N	
J1	6510021170	CONNECTOR	ICME68H-L8-D1121RHA	
J2	6510021040	CONNECTOR	52806-3010	
J3	6510021020	CONNECTOR	52806-1810	
J6	6510021510	CONNECTOR	52807-2410	
BT1	3020000130	LITHIUM	CR3032-1T2	
W1	8900009030	CABLE	OPC-902	
W2	8900008740	CABLE	OPC-867	[GEN]
	8900009380	CABLE	OPC-906	[EUR]
W3	8900008920	CABLE	OPC-882	
W19	7120000470	JUMPER	ERDS2T0	
W20	7120000470	JUMPER	ERDS2T0	
EP1	0910051401	PCB	B 5306A	

[SW UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
Q1	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q2	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q3	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q4	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
D1	1750000550	S.DIODE	1SS355 TE-17
D2	1750000550	S.DIODE	1SS355 TE-17
D3	1750000550	S.DIODE	1SS355 TE-17
D4	1750000550	S.DIODE	1SS355 TE-17
D5	1750000550	S.DIODE	1SS355 TE-17
D6	1750000550	S.DIODE	1SS355 TE-17
D7	1750000550	S.DIODE	1SS355 TE-17
D8	1750000550	S.DIODE	1SS355 TE-17
D9	1750000550	S.DIODE	1SS355 TE-17
D10	1750000550	S.DIODE	1SS355 TE-17
D11	1750000550	S.DIODE	1SS355 TE-17
D12	1750000550	S.DIODE	1SS355 TE-17
D13	1750000550	S.DIODE	1SS355 TE-17
D14	1750000550	S.DIODE	1SS355 TE-17
D15	1750000550	S.DIODE	1SS355 TE-17
D16	1750000550	S.DIODE	1SS355 TE-17
D17	1750000550	S.DIODE	1SS355 TE-17
R1	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R2	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R3	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R4	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R5	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R6	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R7	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R8	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R9	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R10	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R11	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R12	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R13	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R14	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R15	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R16	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R17	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
C1	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C4	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C5	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C6	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C7	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C8	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C9	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C12	4550006480	S.TANTALUM	TEMSVA 1C 475M-8L
C14	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
J1	6510021020	CONNECTOR	52806-1810
DS1	5040002420	S.LED	SML-310MT T86
DS2	5040002420	S.LED	SML-310MT T86
DS3	5040002420	S.LED	SML-310MT T86
DS4	5040002420	S.LED	SML-310MT T86
DS5	5040002420	S.LED	SML-310MT T86
DS6	5040002420	S.LED	SML-310MT T86
DS7	5040002420	S.LED	SML-310MT T86
DS8	5040002420	S.LED	SML-310MT T86
DS9	5040002420	S.LED	SML-310MT T86
S1	2230001030	SWITCH	MS-666K
S2	2260001680	S.SWITCH	SKQDPB
S3	2260001680	S.SWITCH	SKQDPB
S4	2260001680	S.SWITCH	SKQDPB
S5	2260001680	S.SWITCH	SKQDPB
S6	2260001680	S.SWITCH	SKQDPB
S7	2260001680	S.SWITCH	SKQDPB
S8	2260001680	S.SWITCH	SKQDPB
S9	2260001680	S.SWITCH	SKQDPB

S.=Surface mount

FP-561

[SW UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
S10	2260001680	S.SWITCH	SKQDPB
S11	2260001680	S.SWITCH	SKQDPB
S12	2260001680	S.SWITCH	SKQDPB
S13	2260001680	S.SWITCH	SKQDPB
S14	2260001680	S.SWITCH	SKQDPB
S15	2260001680	S.SWITCH	SKQDPB
S16	2260001680	S.SWITCH	SKQDPB
S17	2260001680	S.SWITCH	SKQDPB
S18	2260001680	S.SWITCH	SKQDPB
SP1	2520000110	PIEZO BUZZER	PS1740P02
W1	8900008340	CABLE	OPC-816
EP1	0910051410	PCB	B 5307

[DISP UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
DS1	5030001720	LCD	LQ6AN102

5-2 RD-200

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
IC1	1110001971	S.IC	μPC1676G-T1
IC2	1790000050	IC	ND487C1-3R
IC3	1110003490	S.IC	TA31136FN (D,EL)
IC4	1110002700	S.IC	NJM2904M-T1
IC5	1130003830	S.IC	TC7S04F (TE85R)
IC6	1140004550	S.IC	M65343FP/SC1287
IC7	1130007990	S.IC	TC3W03FU (TE12L)
IC8	1180001250	S.IC	TA7808F (TE16L)
IC9	1180001070	S.IC	TA7805F (TE16L)
IC10	1130003830	S.IC	TC7S04F (TE85R)
IC11	1110004860	S.IC	S-80842ALUP-EA6-T2
IC12	1140008220	S.IC	HD64F3644H
IC13	1140005880	S.IC	X25320S8I-2.7T6
IC14	1130003830	S.IC	TC7S04F (TE85R)
IC15	1130006370	S.IC	TC4093BF
IC16	1130006680	S.IC	TC7S02F (TE85R)
IC17	1130009480	S.IC	TC4049BF (N)
IC18	1170000280	S.IC	TLP121 (GB-TPL)
IC19	1110002750	S.IC	TA75S01F (TE85R)
Q1	1580000390	S.FET	3SK131K-T1
Q2	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q3	1540000550	S.TRANSISTOR	2SD1664 T100Q
Q4	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q5	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q6	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q7	1510000500	S.TRANSISTOR	2SA1162-GR (TE85R)
Q8	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q9	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q10	1510000510	S.TRANSISTOR	2SA1576A T106R
Q11	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q12	1510000510	S.TRANSISTOR	2SA1576A T106R
D1	1710000840	S.DIODE	1SR154-400 TE25
D2	1790001520	S.ZENER	MA8075-L (TX)
D3	1750000550	S.DIODE	1SS355 TE-17
D4	1750000550	S.DIODE	1SS355 TE-17
D5	1730000910	S.ZENER	RD12M-T2B2
D6	1750000550	S.DIODE	1SS355 TE-17
FI1	2020001320	CERAMIC	CFJ455K8
X1	6050010760	S.XTAL	DSX751S (14.5984 MHz)
L1	6200003950	S.COIL	HF50ACC 322513-T
L2	6200003120	S.COIL	NL 322522T-8R2J
L3	6200006380	S.COIL	ELJFC 150K 15U
L4	6200008610	S.COIL	ELJFC 390K-F 39U
L5	6200003260	S.COIL	NL 322522T-101J
L6	6200003140	S.COIL	NL 322522T-150J
L7	6200006430	S.COIL	ELJFC 180K-F
L8	6140001500	COIL	LR-171
L9	6140001500	COIL	LR-171
L10	6200008600	S.COIL	ELJFC 560K-F 56U
L11	6200002090	S.COIL	ELJFB 681K-F
L12	6200005550	S.COIL	ELJFC 100K-F
L13	6200005550	S.COIL	ELJFC 100K-F
L14	6200005550	S.COIL	ELJFC 100K-F
L15	6200002970	S.COIL	NL 322522T-121J
L16	6200003240	S.COIL	NL 322522T-221J
L17	6200008640	S.COIL	NL 322522T-391J
L18	6200003110	S.COIL	NL 322522T-6R8J
L19	6200005550	S.COIL	ELJFC 100K-F
L20	6200003950	S.COIL	HF50ACC 322513-T
L21	6200005550	S.COIL	ELJFC 100K-F
L22	6200008600	S.COIL	ELJFC 560K-F 56U
L23	6200003200	S.COIL	NL 322522T-560J
L24	6200000780	S.COIL	LQH 3N 100K 14
L25	6200008600	S.COIL	ELJFC 560K-F 56U
R1	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R2	7030003230	S.RESISTOR	ERJ3GEYJ 180 V (18 Ω)
R3	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R4	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)

S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R5	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R6	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R7	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R8	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R9	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R10	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R11	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R12	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R13	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R14	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R15	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R16	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R17	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R18	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R19	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R20	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R21	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R22	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R23	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R24	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R25	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R26	7030007220	S.RESISTOR	ERA3YED 202V
R27	7030007220	S.RESISTOR	ERA3YED 202V
R28	7030007230	S.RESISTOR	ERA3YED 102V
R29	7030007220	S.RESISTOR	ERA3YED 202V
R30	7030007230	S.RESISTOR	ERA3YED 102V
R31	7030007220	S.RESISTOR	ERA3YED 202V
R32	7030007230	S.RESISTOR	ERA3YED 102V
R33	7030007220	S.RESISTOR	ERA3YED 202V
R34	7030007230	S.RESISTOR	ERA3YED 102V
R35	7030007220	S.RESISTOR	ERA3YED 202V
R36	7030007230	S.RESISTOR	ERA3YED 102V
R37	7030007220	S.RESISTOR	ERA3YED 202V
R38	7030007230	S.RESISTOR	ERA3YED 102V
R39	7030007220	S.RESISTOR	ERA3YED 202V
R40	7030007230	S.RESISTOR	ERA3YED 102V
R41	7030007220	S.RESISTOR	ERA3YED 202V
R42	7030007230	S.RESISTOR	ERA3YED 102V
R43	7030007220	S.RESISTOR	ERA3YED 202V
R44	7030007230	S.RESISTOR	ERA3YED 102V
R45	7030007220	S.RESISTOR	ERA3YED 202V
R46	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R47	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R48	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R49	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R50	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R51	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R52	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R53	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R54	7030006080	S.RESISTOR	ERJ1WYJ220H (22 Ω)
R55	7030006080	S.RESISTOR	ERJ1WYJ220H (22 Ω)
R56	7030006080	S.RESISTOR	ERJ1WYJ220H (22 Ω)
R57	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R58	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R59	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R60	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R61	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R62	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R63	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R64	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R65	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R66	7030004770	S.RESISTOR	ERJ3GEYF 113 V (11 kΩ)
R67	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R68	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R69	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R70	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R71	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R72	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R73	7030004050	S.RESISTOR	ERJ3GEYJ 1R0 V (1 Ω)
R74	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R75	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R76	7030004050	S.RESISTOR	ERJ3GEYJ 1R0 V (1 Ω)
R77	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R78	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R79	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R80	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R81	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R82	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R83	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R84	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R85	7030000360	S.RESISTOR	MCR10EZHJ 680 Ω (681)
R86	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R87	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R88	7030007220	S.RESISTOR	ERA3YED 202V
R89	7030007220	S.RESISTOR	ERA3YED 202V
R90	7030007230	S.RESISTOR	ERA3YED 102V
R91	7030007220	S.RESISTOR	ERA3YED 202V
R92	7030007230	S.RESISTOR	ERA3YED 102V
R93	7030007220	S.RESISTOR	ERA3YED 202V
R94	7030007230	S.RESISTOR	ERA3YED 102V
R95	7030007220	S.RESISTOR	ERA3YED 202V
R96	7030007230	S.RESISTOR	ERA3YED 102V
R97	7030007220	S.RESISTOR	ERA3YED 202V
R98	7030007230	S.RESISTOR	ERA3YED 102V
R99	7030007220	S.RESISTOR	ERA3YED 202V
R100	7030007230	S.RESISTOR	ERA3YED 102V
R101	7030007220	S.RESISTOR	ERA3YED 202V
R102	7030007230	S.RESISTOR	ERA3YED 102V
R103	7030007220	S.RESISTOR	ERA3YED 202V
R104	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R106	7030004050	S.RESISTOR	ERJ3GEYJ 1R0 V (1 Ω)
R107	7030001090	S.RESISTOR	MCR50JZHJ 47 Ω (470)
R108	7030001090	S.RESISTOR	MCR50JZHJ 47 Ω (470)
R109	7510000790	S.THERMISTOR	NTCCS2012 4AH 473KC-T
R110	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R111	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R112	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R113	7030000360	S.RESISTOR	MCR10EZHJ 680 Ω (681)
C2	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C3	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C4	4030008860	S.CERAMIC	C1608 JB 1C 153K-T-A
C5	4030008860	S.CERAMIC	C1608 JB 1C 153K-T-A
C6	4030010770	S.CERAMIC	C1608 JB 1H 392K-T-A
C7	4030008850	S.CERAMIC	C1608 JB 1C 123K-T-A
C8	4030008870	S.CERAMIC	C1608 JB 1C 183K-T-A
C9	4030014300	S.CERAMIC	C1608 JB 1C 563K-T-A
C10	4030008870	S.CERAMIC	C1608 JB 1C 183K-T-A
C11	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C12	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C13	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C14	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C15	4030008850	S.CERAMIC	C1608 JB 1C 123K-T-A
C16	4030009970	S.CERAMIC	C1608 JB 1H 182K-T-A
C17	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C18	4030009580	S.CERAMIC	C1608 JB 1H 681K-T-A
C19	4030008860	S.CERAMIC	C1608 JB 1C 153K-T-A
C20	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C21	4030010020	S.CERAMIC	C1608 JB 1H 122K-T-A
C22	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C23	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C24	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C25	4030007160	S.CERAMIC	C1608 CH 1H 181J-T-A
C26	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C27	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C28	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C29	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C30	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C31	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C32	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C33	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C34	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C35	4030008860	S.CERAMIC	C1608 JB 1C 153K-T-A
C36	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C37	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C38	4030008860	S.CERAMIC	C1608 JB 1C 153K-T-A
C39	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C40	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C41	4030010770	S.CERAMIC	C1608 JB 1H 392K-T-A
C42	4030008910	S.CERAMIC	C1608 JB 1C 393K-T-A
C43	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C44	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C45	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C46	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C47	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C48	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C49	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C50	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C51	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C52	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C53	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C54	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C55	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A

S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
C56	4030007160	S.CERAMIC	C1608 CH 1H 181J-T-A
C57	4030011280	S.CERAMIC	C1608 CH 1H 271J-T-A
C58	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C59	4030007160	S.CERAMIC	C1608 CH 1H 181J-T-A
C60	4030011330	S.CERAMIC	C1608 CH 1H 391J-T-A
C61	4030011330	S.CERAMIC	C1608 CH 1H 391J-T-A
C62	4030011330	S.CERAMIC	C1608 CH 1H 391J-T-A
C63	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C64	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C65	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C66	4030008650	S.CERAMIC	C1608 JB 1H 332K-T-A
C67	4030008770	S.CERAMIC	C1608 JB 1H 562K-T-A
C68	4030010020	S.CERAMIC	C1608 JB 1H 122K-T-A
C69	4030010770	S.CERAMIC	C1608 JB 1H 392K-T-A
C70	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C71	4610002150	S.TRIMMER	CTZ3S-10A-W1-AF
C72	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C73	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C74	4510006670	S.ELECTROLYTIC	ECEV1CA471P
C75	4510004640	S.ELECTROLYTIC	ECEV1CA470SP
C76	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C77	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C78	4510004640	S.ELECTROLYTIC	ECEV1CA470SP
C79	4550006670	S.TANTALUM	ECST1AD107R
C80	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C81	4510004640	S.ELECTROLYTIC	ECEV1CA470SP
C82	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C83	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C84	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C85	4510004640	S.ELECTROLYTIC	ECEV1CA470SP
C86	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C87	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C88	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C89	4030009000	S.CERAMIC	C2012 JB 1C 224K-T-A
C90	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C91	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C92	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C93	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C94	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C95	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C96	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C97	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C98	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C99	4030008650	S.CERAMIC	C1608 JB 1H 332K-T-A
C100	4030008770	S.CERAMIC	C1608 JB 1H 562K-T-A
C102	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C103	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C104	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C105	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C106	4030008650	S.CERAMIC	C1608 JB 1H 332K-T-A
C107	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C108	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C109	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C110	4550006670	S.TANTALUM	ECST1AD107R
C111	4030008850	S.CERAMIC	C1608 JB 1C 123K-T-A
C112	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C113	4030011340	S.CERAMIC	C1608 CH 1H 471J-T-A
CP1	6910009670	S.CHECK P	HK3-S-T
CP2	6910009670	S.CHECK P	HK3-S-T
J1	6510021660	CONNECTOR	IMSA-9210B-1-03Z525-T
J2	6510021670	CONNECTOR	IMSA-9210B-1-05Z525-T
J3	6510003540	CONNECTOR	S06B-EH-S
J4	6510019420	S.CONNECTOR	B8B-ZR-SM3-TF
EP1	0910051523	PCB	B 5297C

[ANT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
Q1	1560000420	S.FET	2SK209-GR (TE85R)
Q2	1560000420	S.FET	2SK209-GR (TE85R)
Q3	1560000420	S.FET	2SK209-GR (TE85R)
Q4	1560000420	S.FET	2SK209-GR (TE85R)
Q5	1560000420	S.FET	2SK209-GR (TE85R)
Q6	1560000420	S.FET	2SK209-GR (TE85R)
Q7	1560000420	S.FET	2SK209-GR (TE85R)
Q8	1560000420	S.FET	2SK209-GR (TE85R)
D1	1750000610	S.VARICAP	MA2SV0500L
D2	1750000610	S.VARICAP	MA2SV0500L
D3	1750000610	S.VARICAP	MA2SV0500L
D4	1750000610	S.VARICAP	MA2SV0500L
D5	1750000610	S.VARICAP	MA2SV0500L
D6	1750000610	S.VARICAP	MA2SV0500L
D7	1750000610	S.VARICAP	MA2SV0500L
D8	1750000610	S.VARICAP	MA2SV0500L
D9	1750000610	S.VARICAP	MA2SV0500L
D10	1750000610	S.VARICAP	MA2SV0500L
D11	1750000610	S.VARICAP	MA2SV0500L
D12	1750000610	S.VARICAP	MA2SV0500L
L1	6150005020	COIL	LS-529
R1	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 kΩ)
R2	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 kΩ)
R3	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R4	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 kΩ)
R5	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R6	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R7	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 kΩ)
R8	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R9	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R10	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 kΩ)
R11	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R12	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R13	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 kΩ)
R14	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R15	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R16	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R17	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R18	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R19	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R20	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R21	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R22	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R23	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R24	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R25	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R26	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R27	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R28	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
C1	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C2	4030009530	S.CERAMIC	C1608 CH 1H 030B-T-A
C3	4610002150	S.TRIMMER	CTZ3S-10A-W1-AF
C4	4610002150	S.TRIMMER	CTZ3S-10A-W1-AF
C5	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C6	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C7	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C8	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C9	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C10	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C11	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C12	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C13	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C14	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C15	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C16	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C17	4510004640	S.ELECTROLYTIC	ECEV1CA470SP
C18	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C19	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C20	4550004010	S.TANTALUM	TEMSVA2 1A 105M-8L
C21	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C22	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C23	4550004010	S.TANTALUM	TEMSVA2 1A 105M-8L
C24	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C25	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N

S.=Surface mount

ANT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
C26	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C27	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
J1	6910005280	CONNECTOR	IMSA-9110S-03
J2	6910005300	CONNECTOR	IMSA-9110S-05
J3	6510018300	S.CONNECTOR	S2B-ZR-SM3A-TF
J4	6510018300	S.CONNECTOR	S2B-ZR-SM3A-TF
J5	6510018300	S.CONNECTOR	S2B-ZR-SM3A-TF
EP1	0910051533	PCB	B 5298C
EP3	3310002220	ANTENNA	OH-3
EP4	3310002220	ANTENNA	OH-3

S.=Surface mount

SECTION 6 MECHANICAL PARTS AND DISASSEMBLY

6-1 FP-561

[CHASSIS PARTS]

REF. NO.	ODER NO.	DESCRIPTION	QTY.
MP1	8210016290	2142 front panel (A) assembly [GEN]	1
	8210016410	2142 front panel (B) assembly [EUR]	1
MP2	8210016300	2142 rear panel assembly [GEN]	1
	8210016420	2142 rear panel (A) assembly [EUR]	1
MP3	8930049451	2142 screen (A) -1	1
MP4	8410002300	2272 heatsink	1
MP5	8930049030	2142 keyboard (A)	1
MP6	8930047480	2142 F-packing	1
MP7	8930047510	2142 R-packing	1
MP8	8110006530	2142 cover	1
MP9	8010017530	2142 chassis	1
MP10	8510011851	2142 shield plate-1	1
MP11	8930042330	Sealing washer (M)	4
MP13	8930039000	1757 sheet	1
MP14	8810004540	Screw BiH M3x8 SUS	4
MP16	8810004540	Screw BiH M3x8 SUS	4
MP18	8810008200	Screw PH BT M2.6x6 NI-ZU	4
MP19	8810008660	Screw PH BT M3x8 NI-ZU	4
MP20	8810008660	Screw PH BT M3x8 NI-ZU	4
MP21	8810008660	Screw PH BT M3x8 NI-ZU	7
MP24	8830000370	Wing nut M5 SUS	1
MP25	8810008230	Bolt hex head M5x20 SUS	1
MP26	8850000500	Spring washer M5 SUS	1
MP27	8850000180	Flat washer M5 SUS	3
MP28	8830000250	Nut M5 SUS	1
MP31	8930047640	2142 handle	1
MP32	8010017500	T-bracket	1
MP33	8010017510	U-bracket	1
MP34	8930047540	2142 shaft plate	1
MP35	8930047530	2142 shaft	1
MP36	8850001740	Spring washer 8L SUS	2
MP37	8810009300	Set screw (J)	1
MP38	8850000210	Flat washer M8 SUS	2
MP39	8820001030	2142 knob bolt	2
MP40	8310025310	Label Circle seal (L)	2

[MAIN UNIT]

REF. NO.	ODER NO.	DESCRIPTION	QTY.
F1	5210000060	Fuse FGB 5A	1
EP2	0850000120	IA023-5B03S (GPS module set)	1
MP1	8510012360	2272 GPS case	1
MP3	8930018520	TR clip (A)	5
MP4	8810008660	Screw PH BT M3x8 NI-ZU	2
MP5	8810000120	Screw PH M2.6x3	2

[LOGIC UNIT]

REF. NO.	ODER NO.	DESCRIPTION	QTY.
W1	8900009030	Cable OPC-902	1
W2	8900008740	Cable OPC-867 [GEN]	1
	8900009380	Cable OPC-906 [EUR]	1
MP1	8810009830	Set screw (C) M2x12	4
MP2	8930001850	Sponge (AD)	1

[SW UNIT]

REF. NO.	ODER NO.	DESCRIPTION	QTY.
SP1	2520000110	Piezo buzzer PS1740P02	1
W1	8900008340	Cable OPC-816	1

[ACCESSORIES]

REF. NO.	ODER NO.	DESCRIPTION	QTY.
W1	8900008040	Cable OPC-786	1
MP1	8930010000	Conector cover	2
MP2	8810001500	Screw PH AO M6x3 SUS	4
MP3	8850000510	Spring washer M6 SUS	4
MP4	8850000190	Flat washer M6 (6x13x1.0) SUS	1
MP5	8930049400	2273 pipe	1
MP6	8930049740	House band HAS-40	2

6-2 RD-200

[CHASSIS PARTS]

REF. NO.	ODER NO.	DESCRIPTION	QTY.
W1	8900008970	Cable OPC-873	1
MP1	8510012340	2273 L-Case	1
MP2	8510012350	2273 U-Case	1
MP3	8930049000	2273 L-plate	1
MP4	8930048990	2273 U-plate	1
MP5	8110006770	2273 cover	1
MP6	8930049390	2273 main seal	1
MP7	8810006050	Icom screw E7	4
MP8	8850000690	Flat washer M3 (3x7x0.5) SUS	4
MP9	8930049990	O-ring (Y)	4
MP10	8810008660	Screw PH BT M3x8 NI-ZU	4
MP11	8810008660	Screw PH BT M3x8 NI-ZU	4
MP12	8810007130	Set screw H M3x6	4
MP13	8810007130	Set screw H M3x6	4
MP15	8930000190	Stud bolt (O)	1
MP16	8930050000	Spacer BS-315	3
MP18	8930049320	2288 Vent. sheet	1
MP20	8810008660	Screw PH BT M3x8 NI-ZU	1

[MAIN UNIT]

REF. NO.	ODER NO.	DESCRIPTION	QTY.
MP1	8510012330	2273 shield case	1
MP2	8510005330	Coil case	1
MP3	8510000470	Mix shield case	1

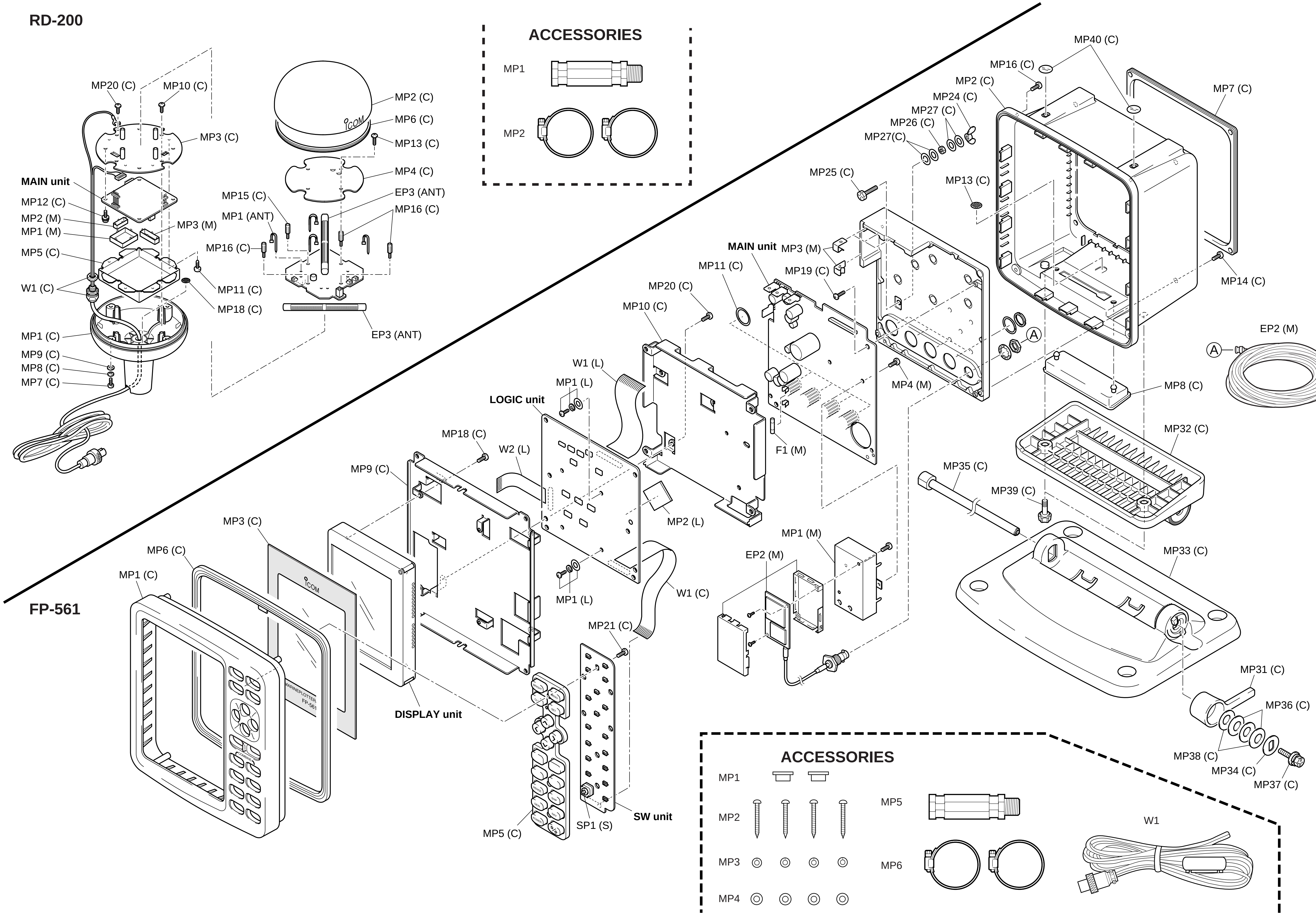
[ANT UNIT]

REF. NO.	ODER NO.	DESCRIPTION	QTY.
EP3	3310002220	OH-3	1
EP4	3310002220	OH-3	1
MP1	8950000180	M.other Cable-tie-80	4

[ACCESSORIES]

REF. NO.	ODER NO.	DESCRIPTION	QTY.
MP1	8930049400	2273 pipe	1
MP2	8930049740	House band HAS-40	2

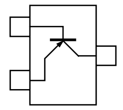
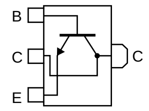
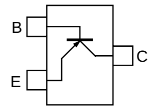
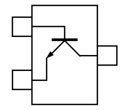
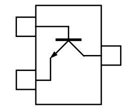
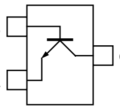
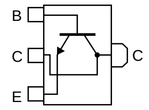
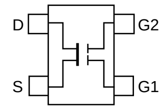
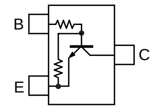
Screw abbreviations
A, B0, BT: Self-tapping
FH: Flat head
NI: Nickel
ZK: Black
PH: Pan head
BiH: Bind head
SUS: Stainless



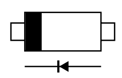
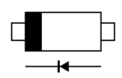
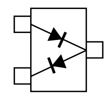
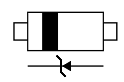
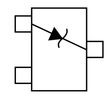
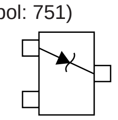
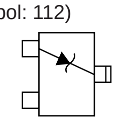
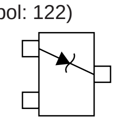
UNIT abbreviation (C): CHASSIS PARTS, (M): MAIN UNIT, (L): LOGIC UNIT, (ANT): ANTENNA UNIT

SECTION 7 SEMI-CONDUCTOR INFORMATION

● TRANSISTOR AND FET'S

2SA1162 GR (Symbol: SG) 	**2SA1213 Y** (Symbol: NY) 	**2SA1576 R** (Symbol: FR) 	**2SC2712 GR** (Symbol: LG) 	**2SC3326 B** (Symbol: CCB) 
2SC4081 R (Symbol: BR) 	**2SD1664 Q** (Symbol: DAQ) 	**3SK131 K** (Symbol: V13) 	**DTC144 EU** (Symbol: 26) 	

● DIODES

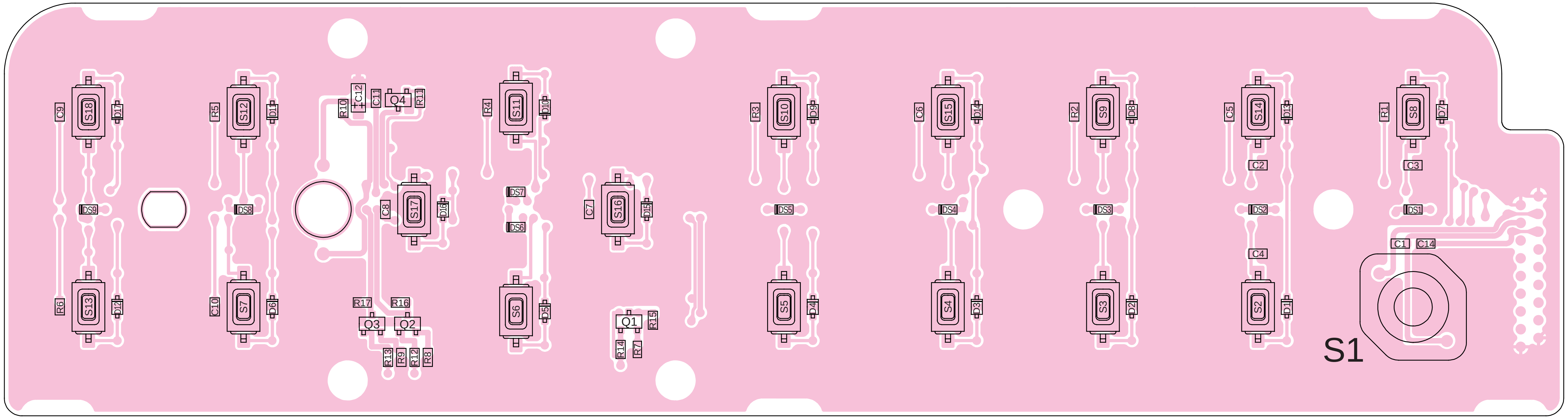
1SR154-400 (Symbol: 14) 	**1SS355** (Symbol: A) 	**DA204 U** (Symbol: K) 	**MA8075 L** (Symbol: 7-5) 	**RD4.7M B3** (Symbol: 473) 
RD7.5M B1 (Symbol: 751) 	**RD11M B2** (Symbol: 112) 	**RD12M B2** (Symbol: 122) 		

SECTION 8 BOARD LAYOUTS

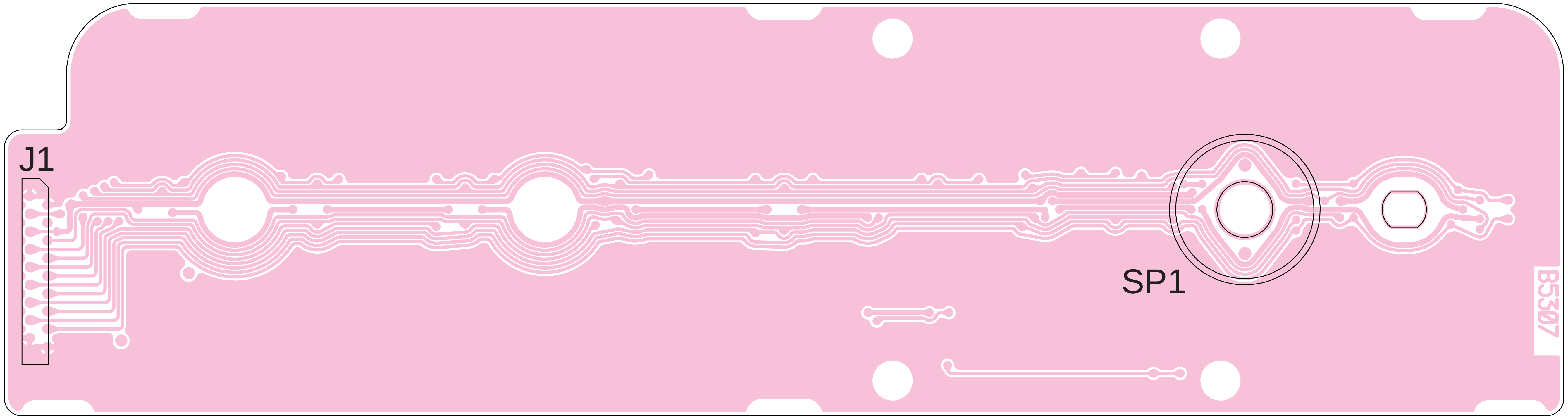
8-1 FP-561

8-1-1 SW UNIT

• TOP VIEW



• **BOTTOM VIEW**

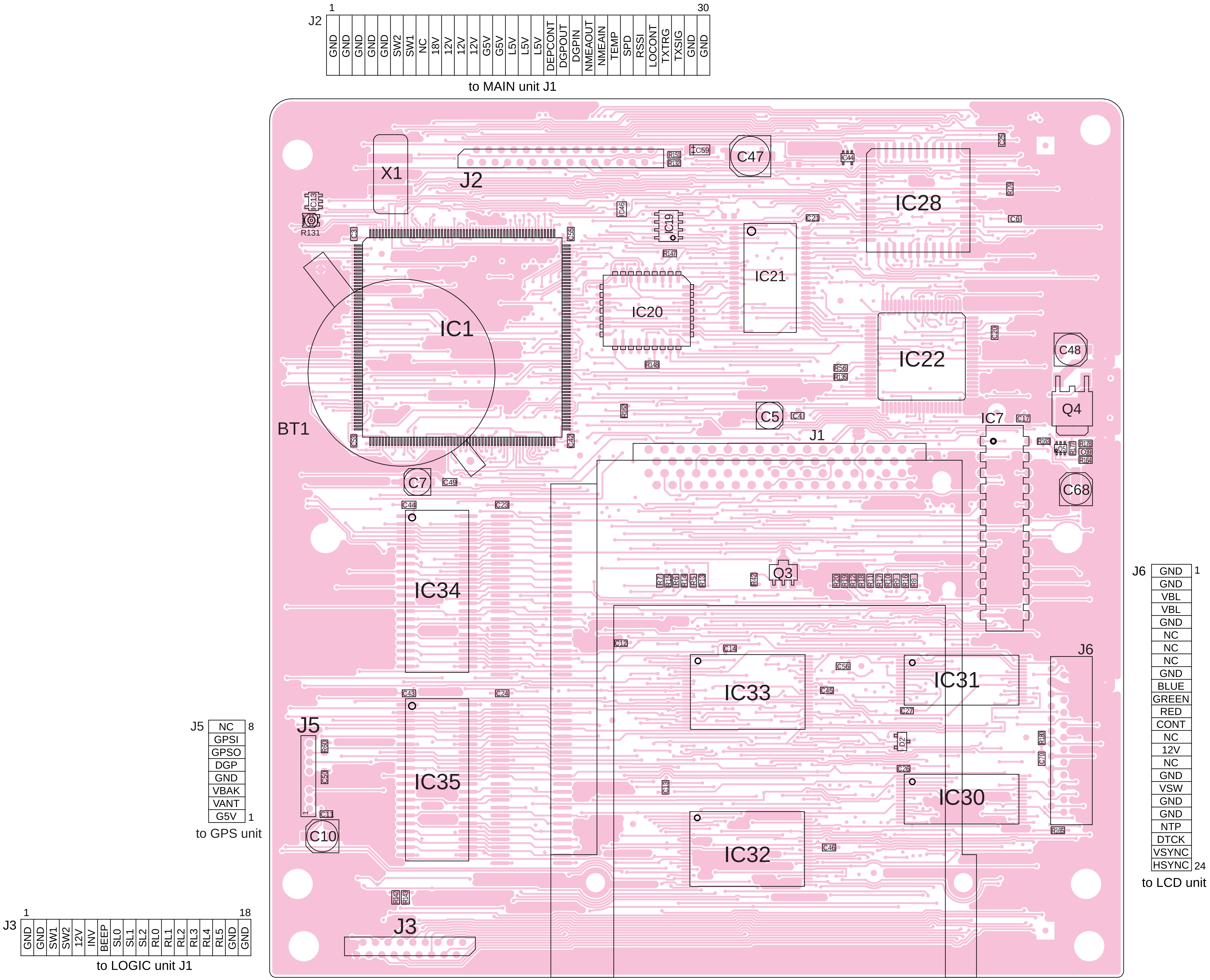


J1

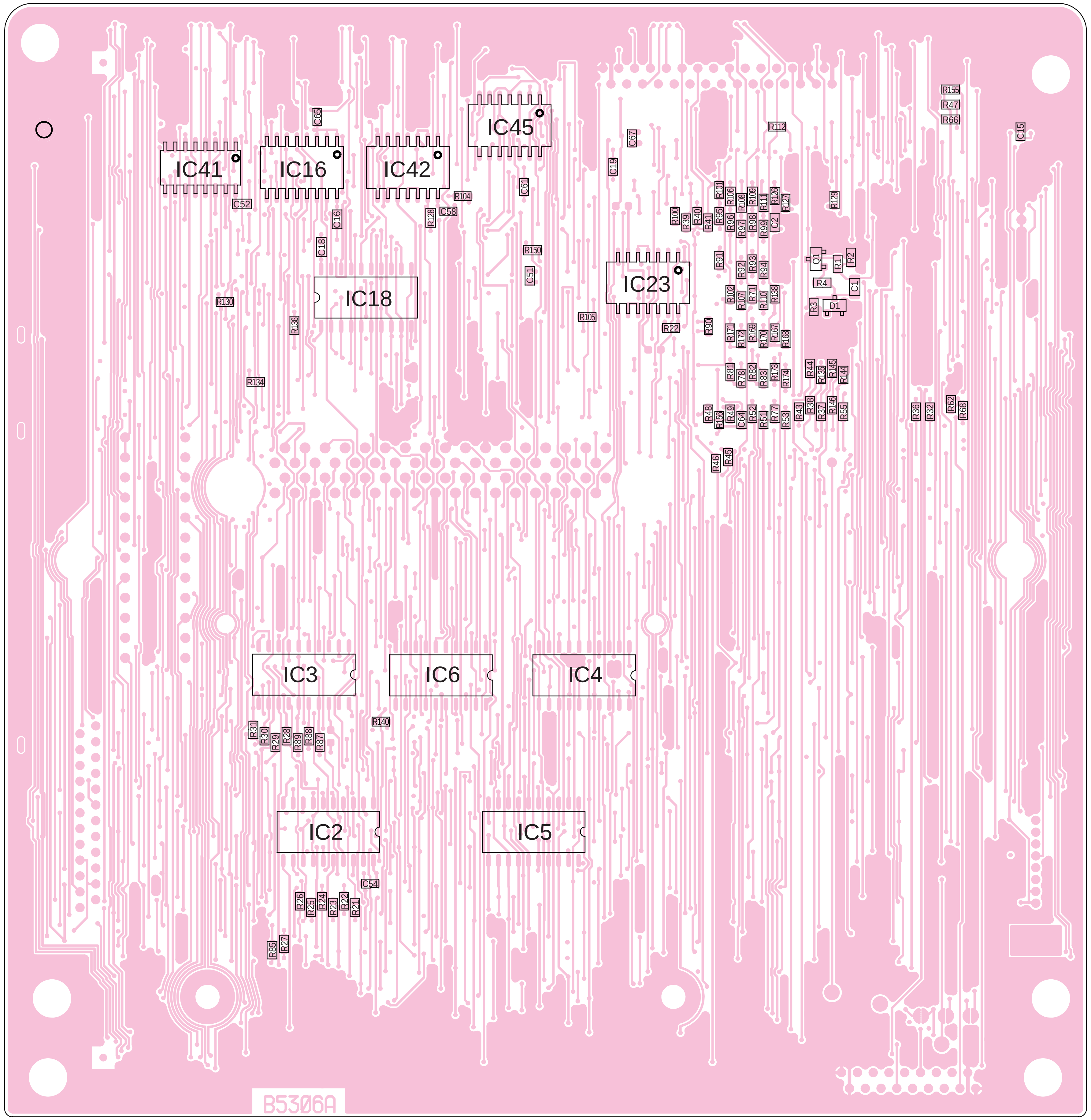
Pin	Signal
1	GND
	GND
	SW2
	SW1
	12V
	INV
	BEEP
	SL0
	SL1
	SL2
	RL0
	RL1
	RL2
	RL3
	RL4
	RL5
	GND
18	GND

to LOGIC unit J3

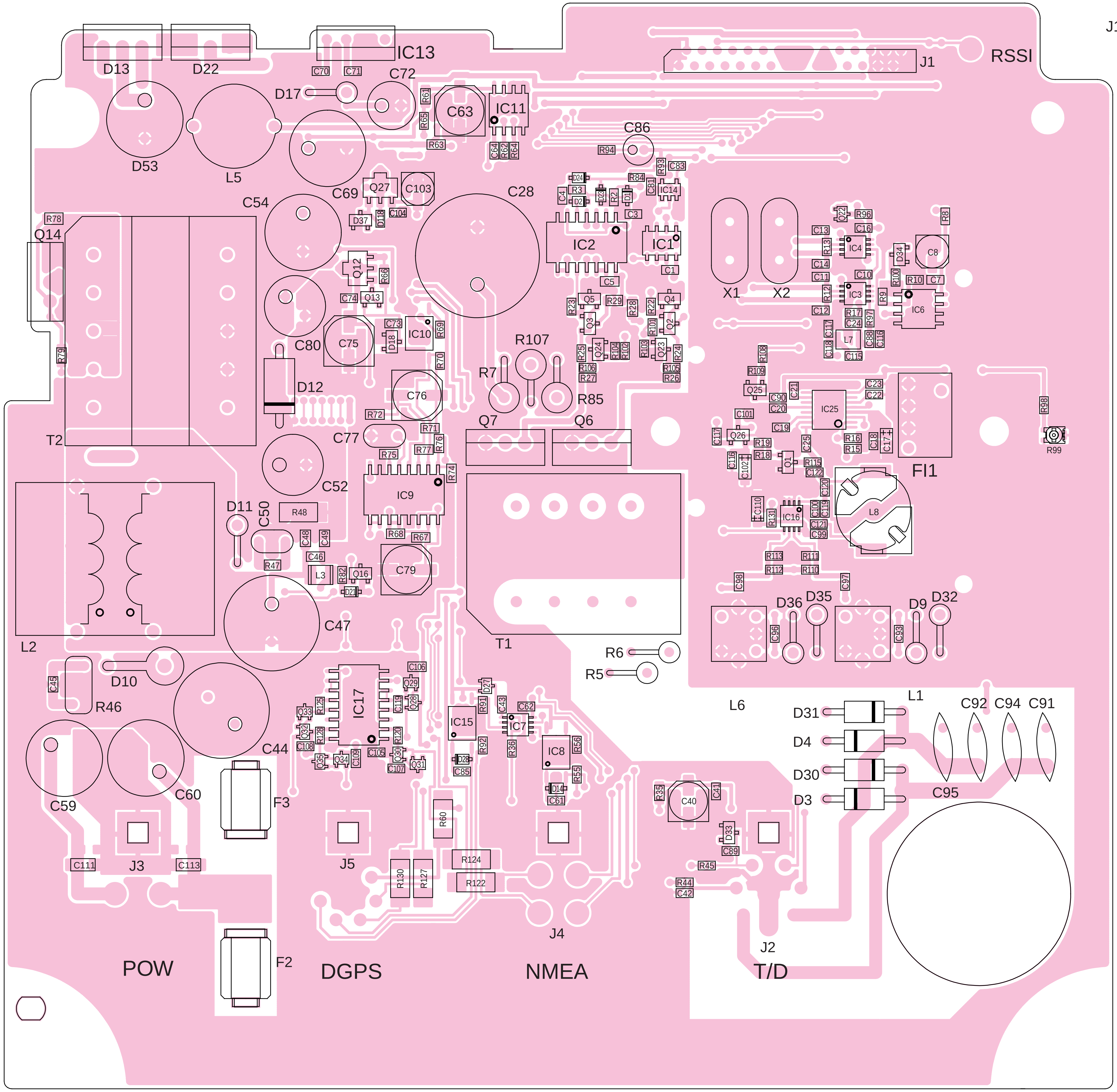
8-1-2 LOGIC UNIT
• TOP VIEW



• **BOTTOM VIEW**



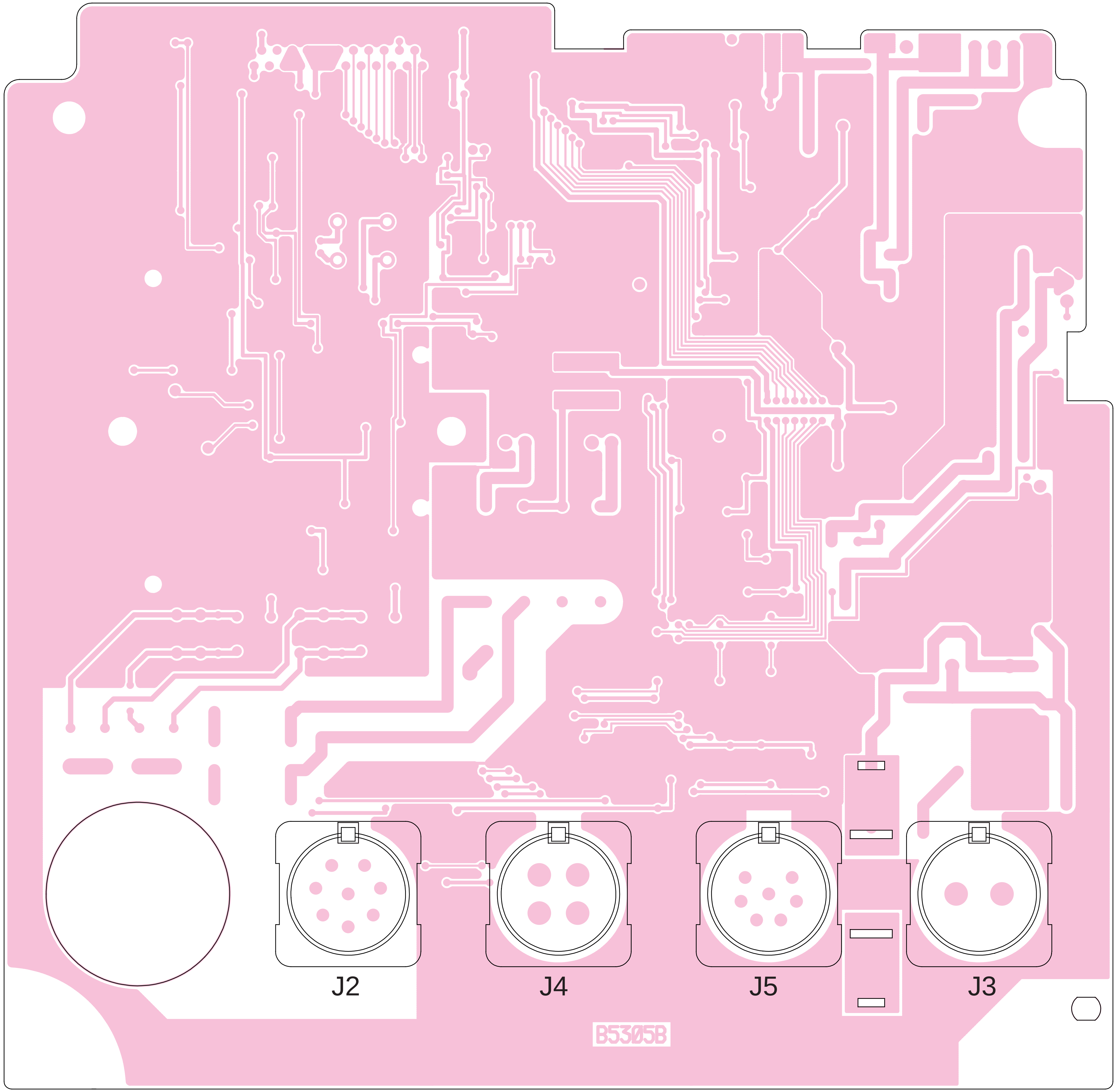
8-1-3 MAIN UNIT
• TOP VIEW



J1 (1–30), to LOGIC unit J2

Pin	Signal
1	GND
2	GND
3	TXSIG
4	TXTRG
5	LOCONT
6	RSSI
7	SPD
8	TEMP
9	NMI
10	NMO
11	DGPI
12	DGPO
13	DEPCONT
14	5V
15	5V
16	5V
17	5V
18	5V
19	12V
20	12V
21	12V
22	NC
23	NC
24	SW1
25	SW2
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27	GND
28	GND
29	GND
30	GND

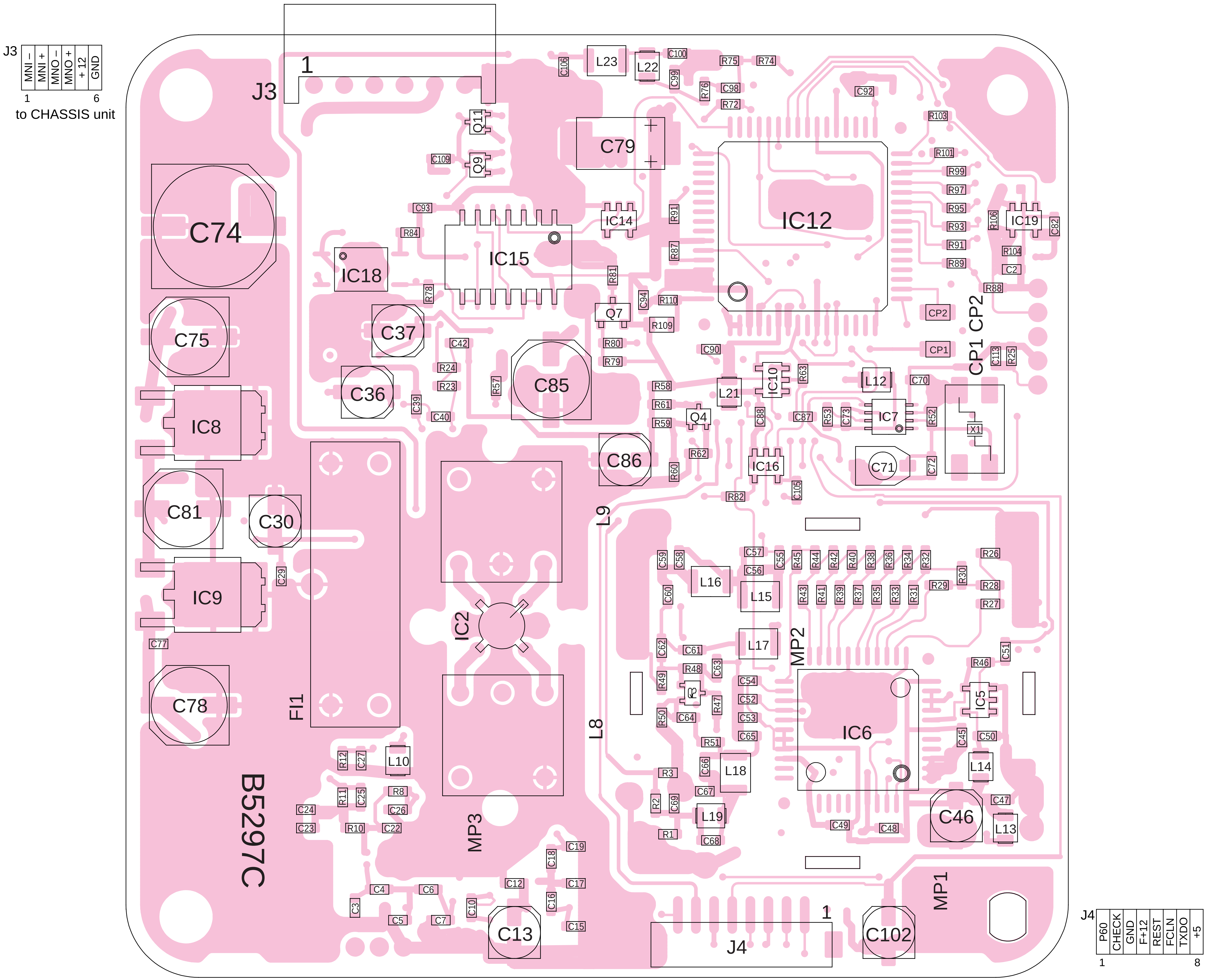
• **BOTTOM VIEW**



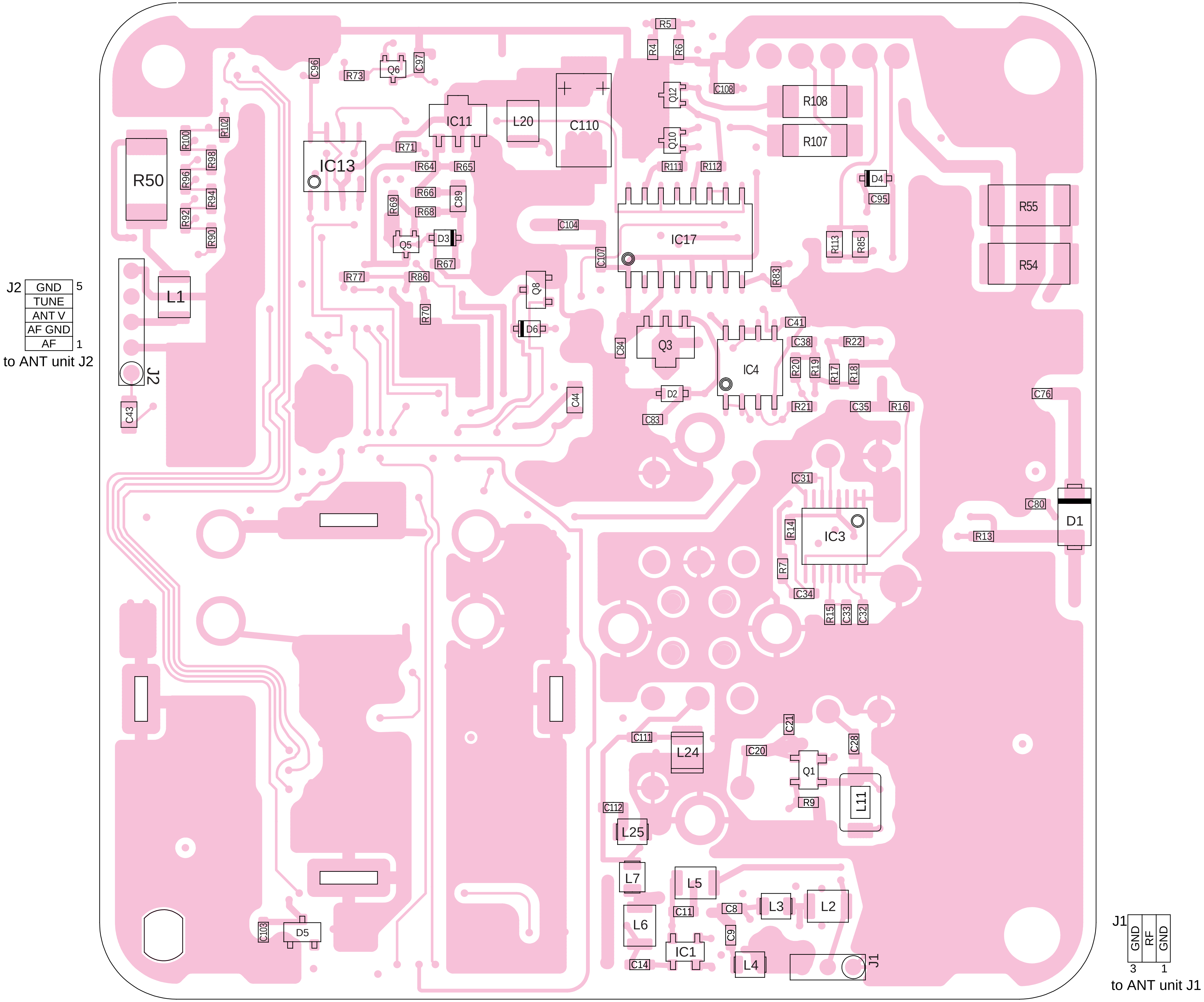
8-2 RD-200

8-2-1 MAIN UNIT

• TOP VIEW

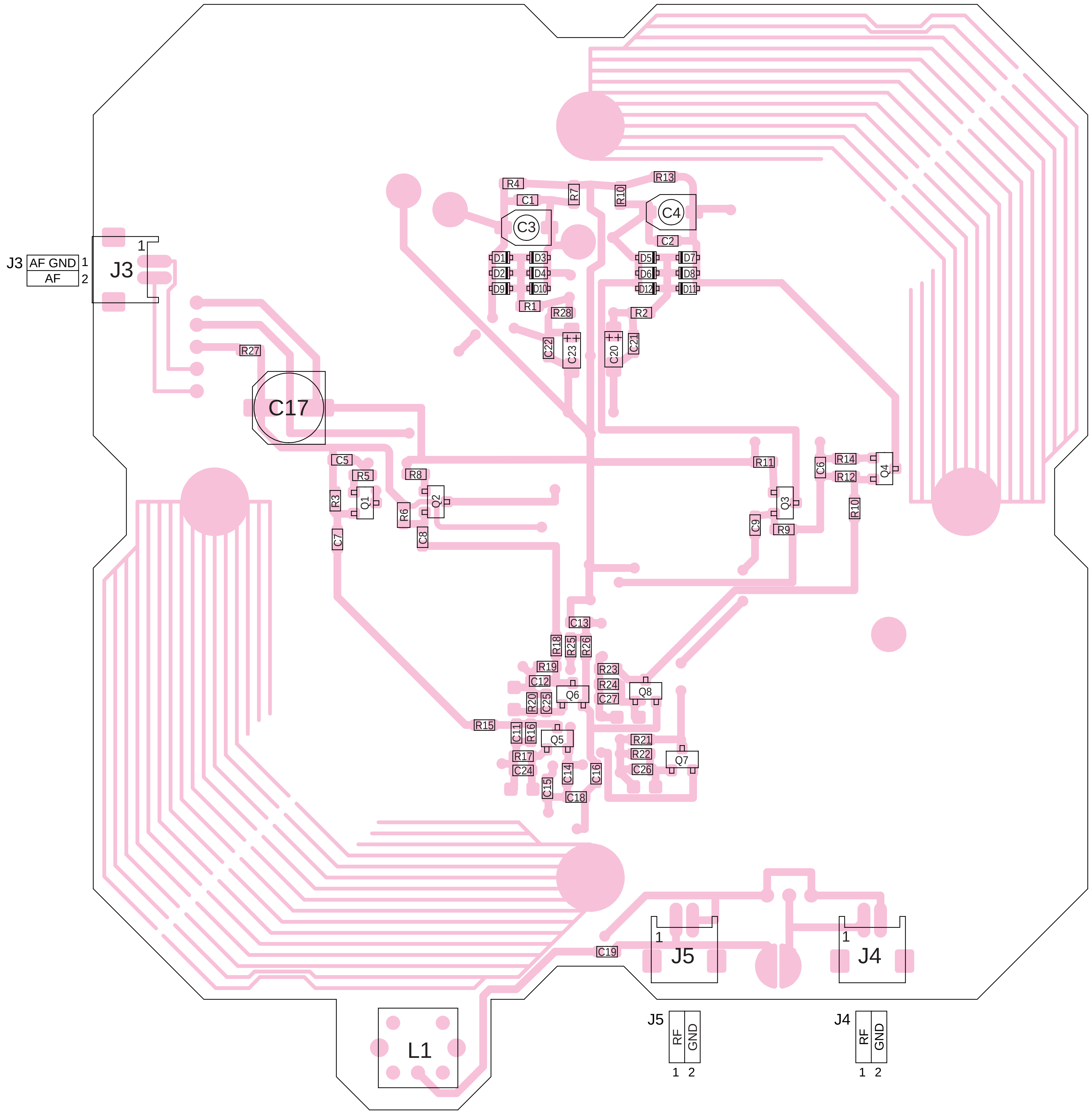


• **BOTTOM VIEW**

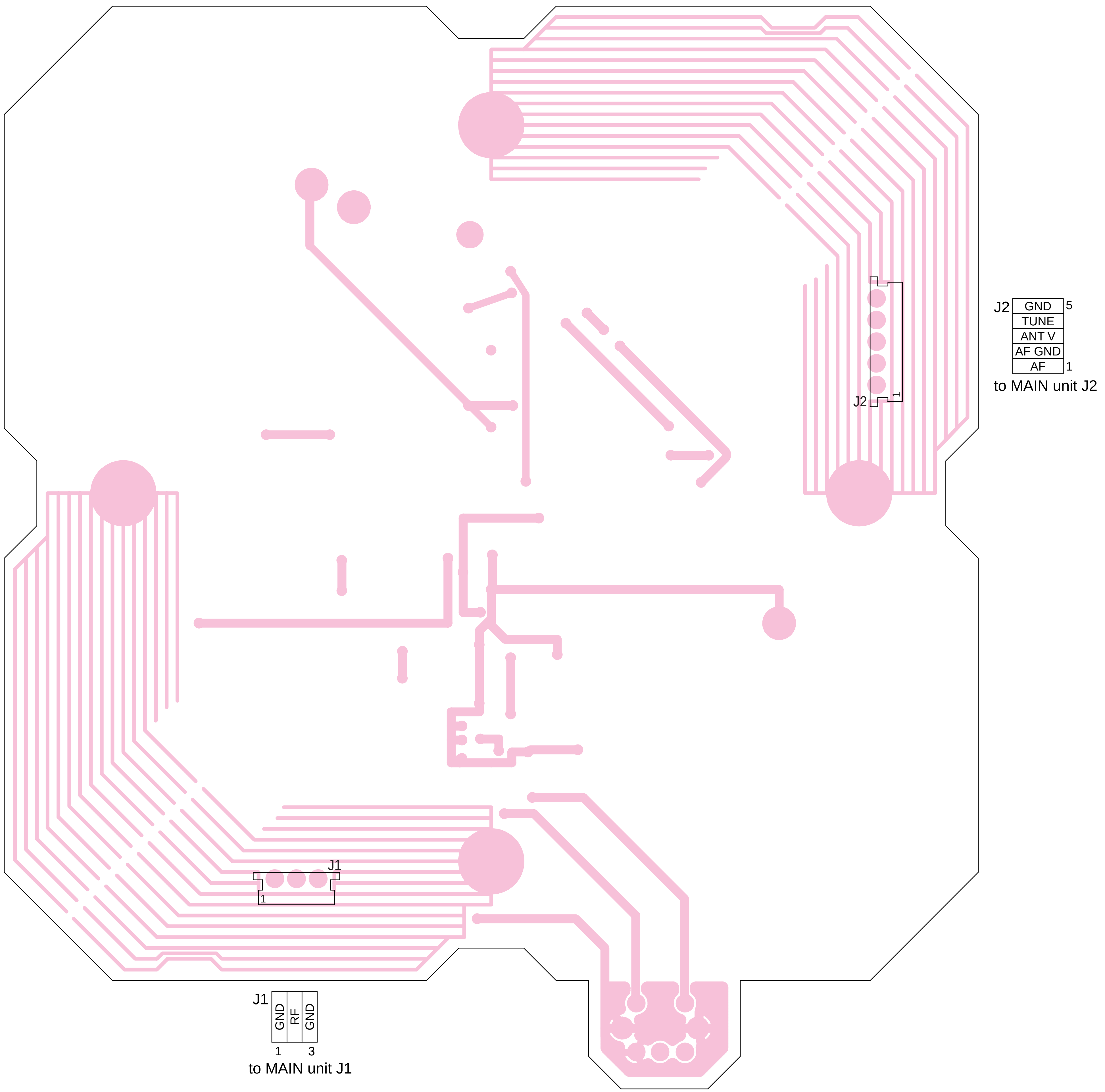


J2
GND
TUNE
ANT V
AF GND
AF
5
1
to ANT unit J2
J1
GND
RF
GND
3
1
to ANT unit J1
R50
R100
R102
R98
R96
R94
R92
R90
L1
C43
IC13
C96
R73
Q6
C97
IC11
L20
C110
R71
R64
R65
R66
C89
R68
R69
Q5
D3
R67
R77
R86
R70
Q8
D6
C44
C104
C107
R5
R4
R6
Q12
C108
Q10
R111
R112
R108
R107
IC17
D4
C95
R113
R85
R55
R54
R83
C84
Q3
D2
C83
IC4
C41
C38
R22
R20
R19
R17
R18
R21
C35
R16
C76
C31
R14
IC3
R7
C34
R15
C33
C32
C80
D1
R13
C111
L24
C20
C21
C28
Q1
R9
L11
C112
L25
L7
L5
L6
C11
C8
L3
L2
C9
IC1
C14
L4
J1
C103
D5

8-2-2 ANT UNIT
• TOP VIEW



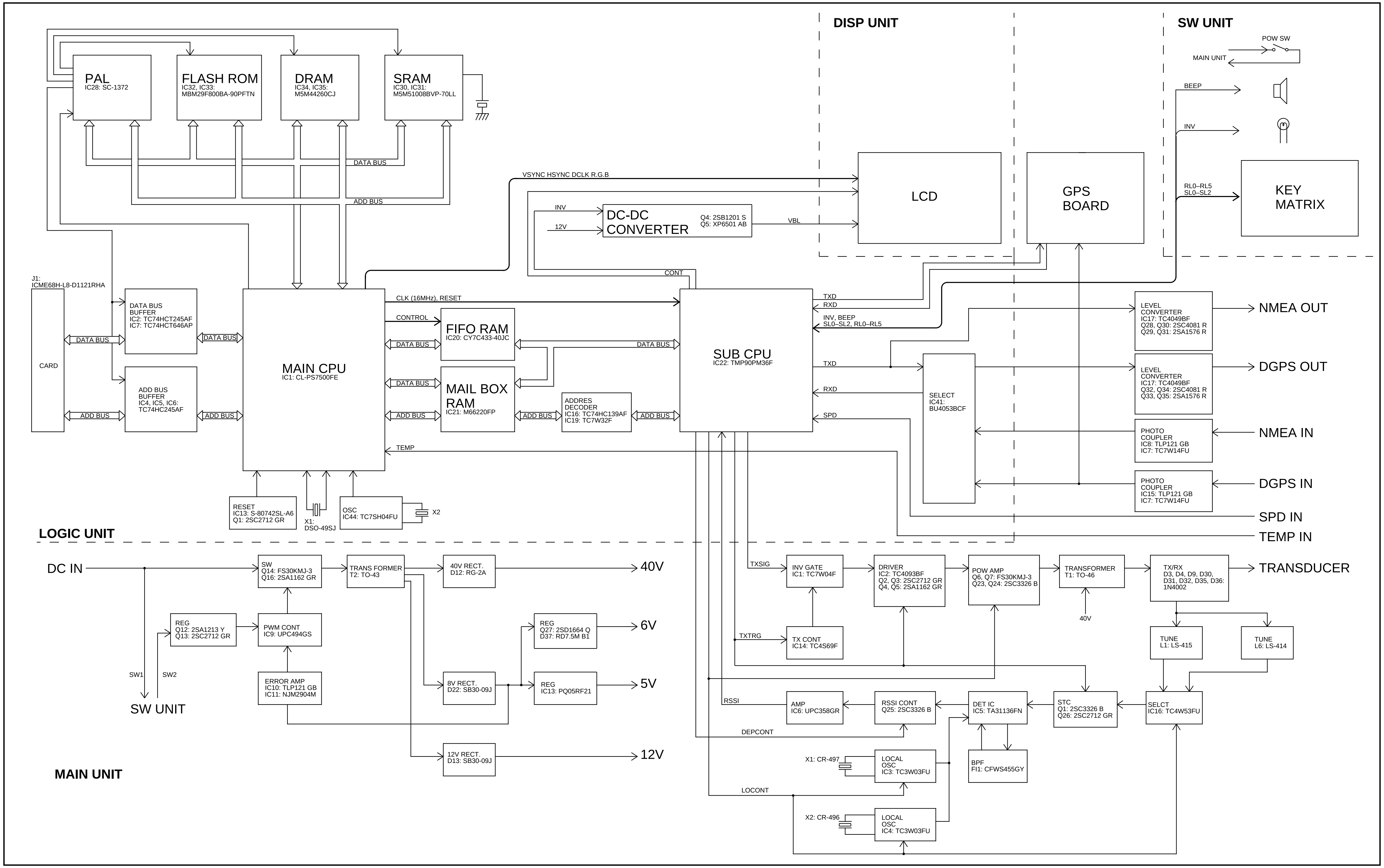
• **BOTTOM VIEW**



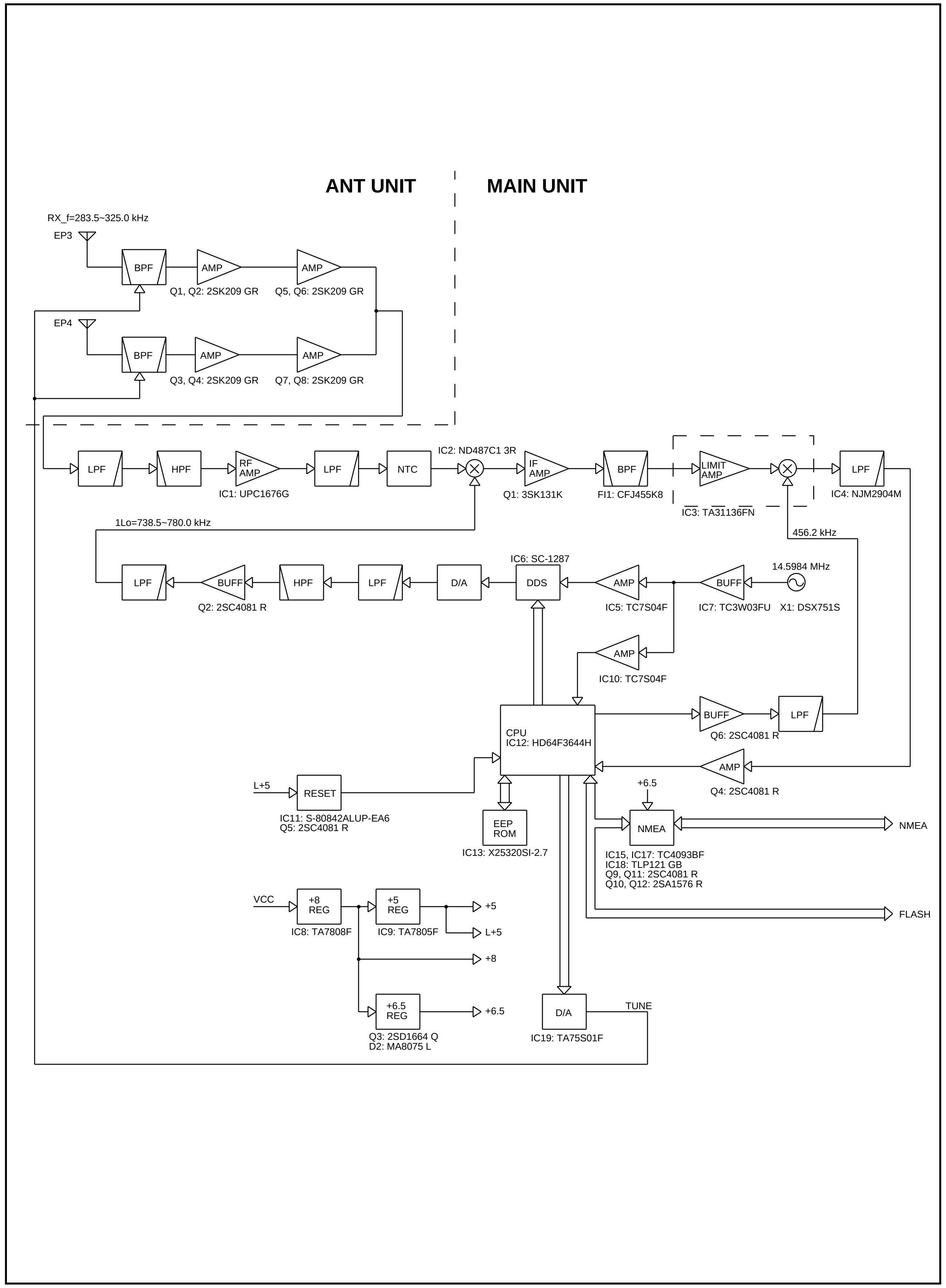
J2
GND
TUNE
ANT V
AF GND
AF
5
1
to MAIN unit J2
J2
J1
J1
GND
RF
GND
1
3
to MAIN unit J1

SECTION 9 BLOCK DIAGRAM

9-1 FP-561



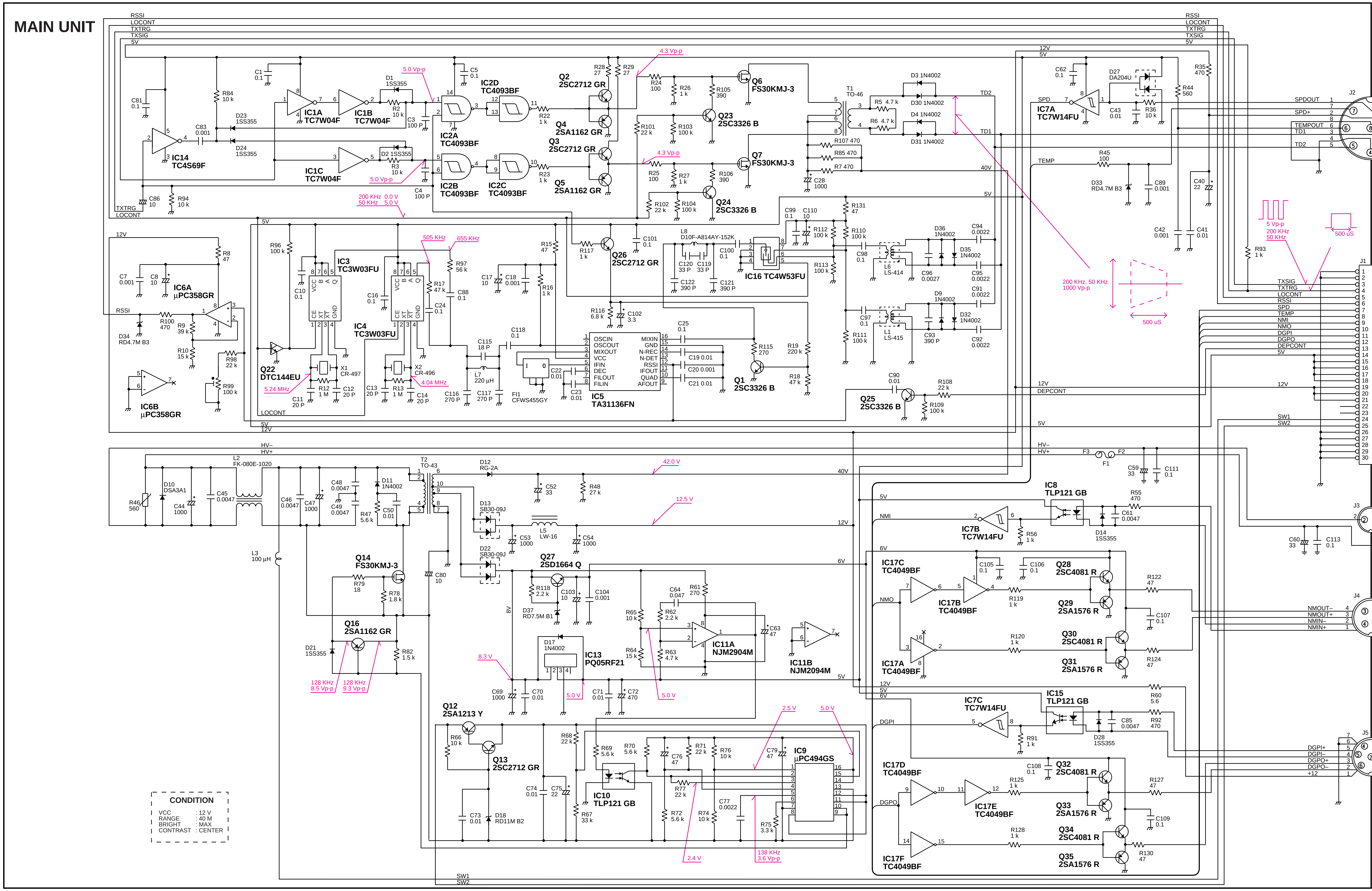
9-2 RD-200

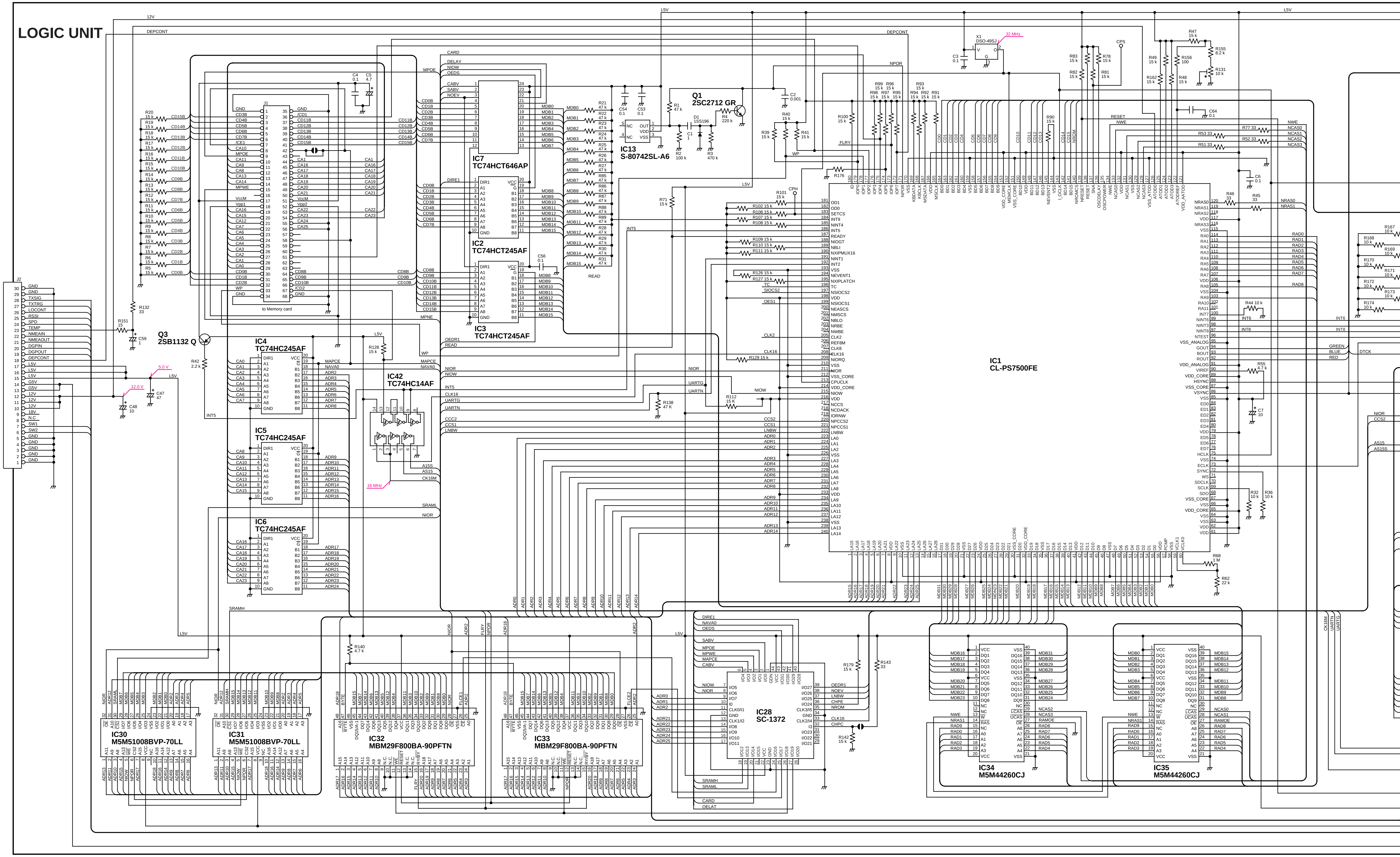


ANT UNIT
MAIN UNIT
RX_f=283.5~325.0 kHz
EP3
EP4
BPF
AMP
Q1, Q2: 2SK209 GR
Q5, Q6: 2SK209 GR
Q3, Q4: 2SK209 GR
Q7, Q8: 2SK209 GR
LPF
HPF
RF AMP
IC1: UPC1676G
NTC
IC2: ND487C1 3R
IF AMP
Q1: 3SK131K
FI1: CFJ455K8
LIMIT AMP
IC3: TA31136FN
IC4: NJM2904M
456.2 kHz
1Lo=738.5~780.0 kHz
BUFF
Q2: 2SC4081 R
D/A
IC6: SC-1287
DDS
IC5: TC7S04F
IC7: TC3W03FU
14.5984 MHz
X1: DSX751S
IC10: TC7S04F
Q6: 2SC4081 R
CPU
IC12: HD64F3644H
Q4: 2SC4081 R
L+5
RESET
IC11: S-80842ALUP-EA6
Q5: 2SC4081 R
EEP ROM
IC13: X25320SI-2.7
+6.5
NMEA
IC15, IC17: TC4093BF
IC18: TLP121 GB
Q9, Q11: 2SC4081 R
Q10, Q12: 2SA1576 R
FLASH
VCC
+8 REG
IC8: TA7808F
+5 REG
IC9: TA7805F
+5
+8
+6.5 REG
Q3: 2SD1664 Q
D2: MA8075 L
IC19: TA75S01F
TUNE

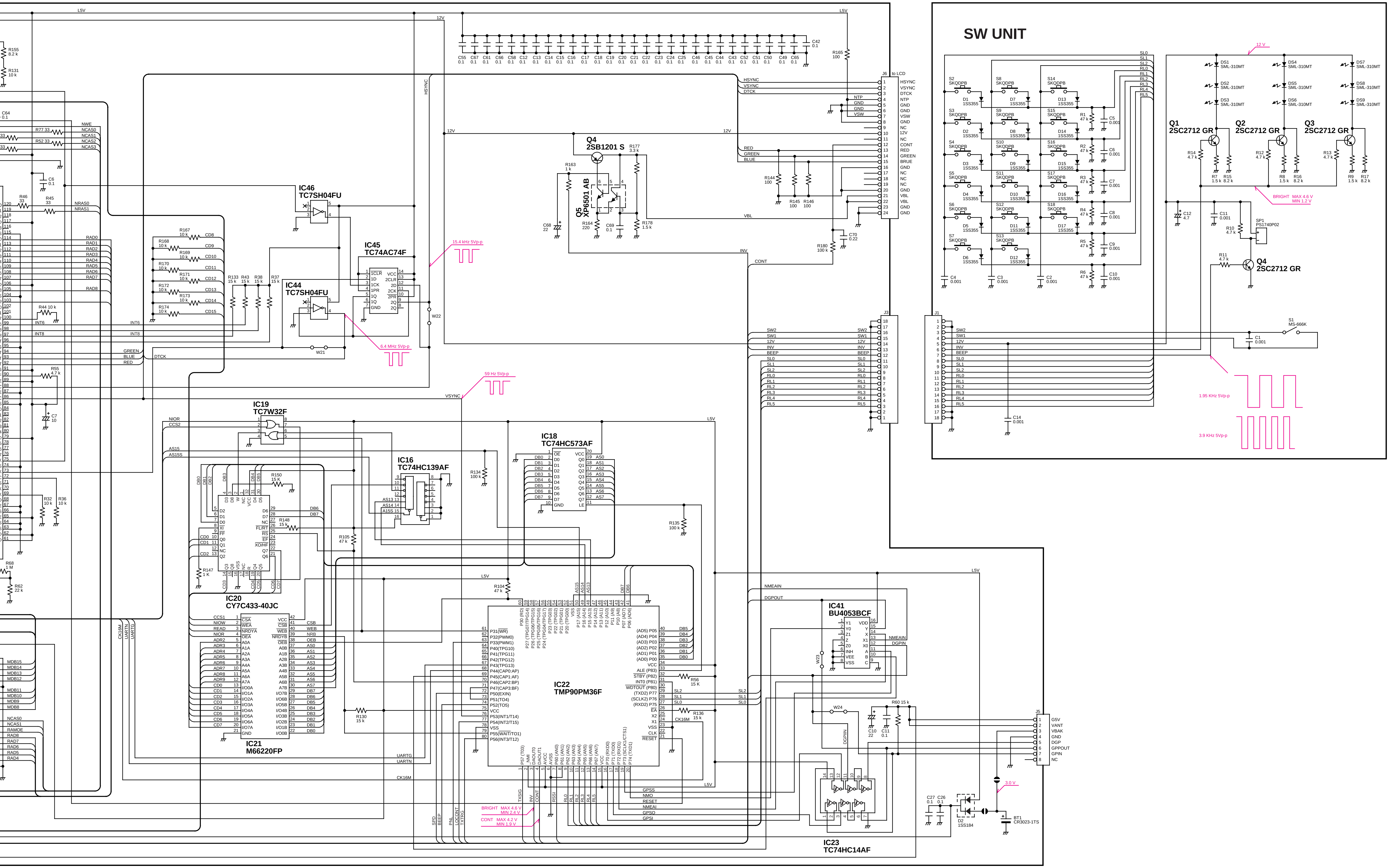
SECTION 10 VOLTAGE DIAGRAM

10-1 FP-561




COMPLETE VIEW



COMPLETE VIEW

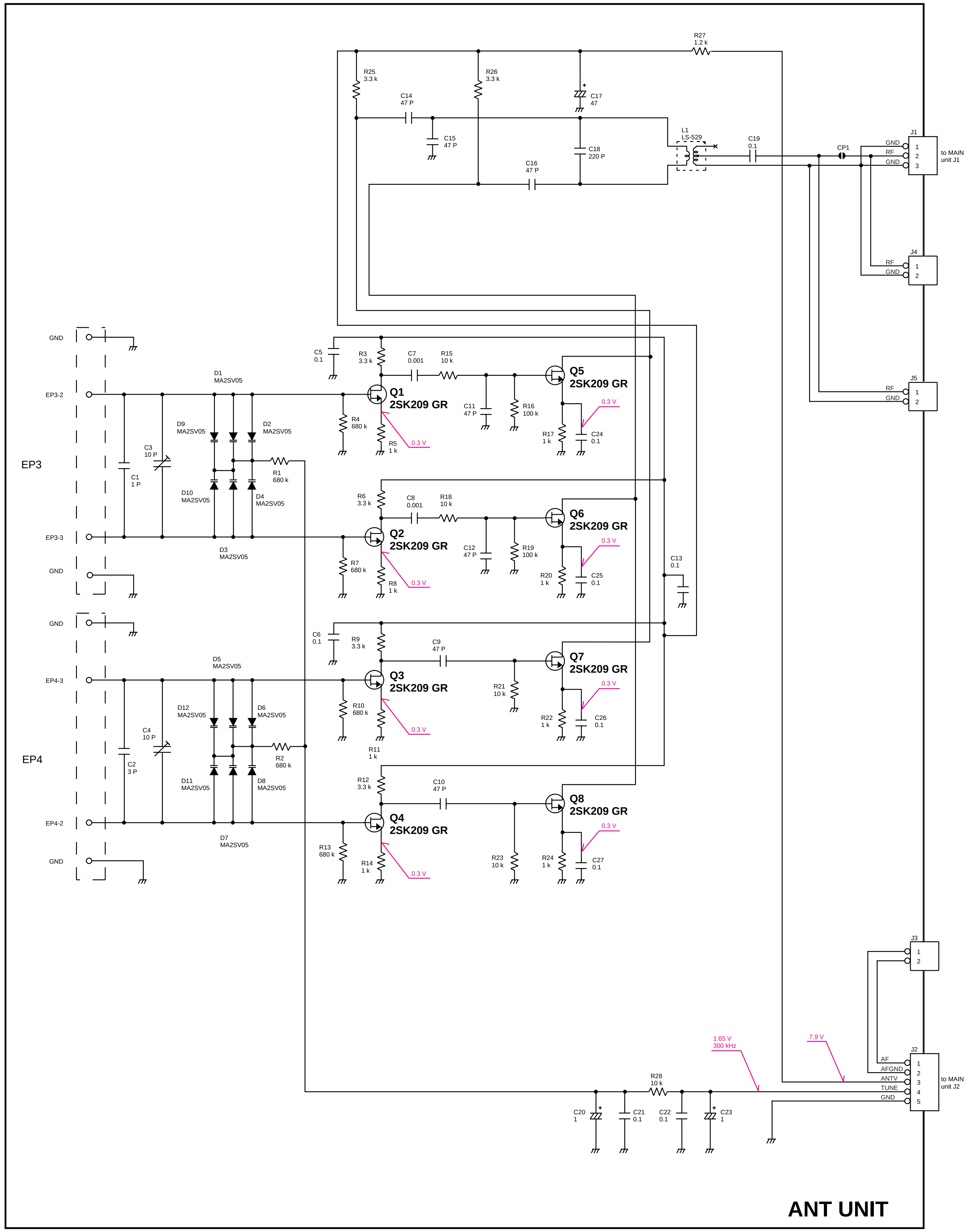


LEFT SIDE

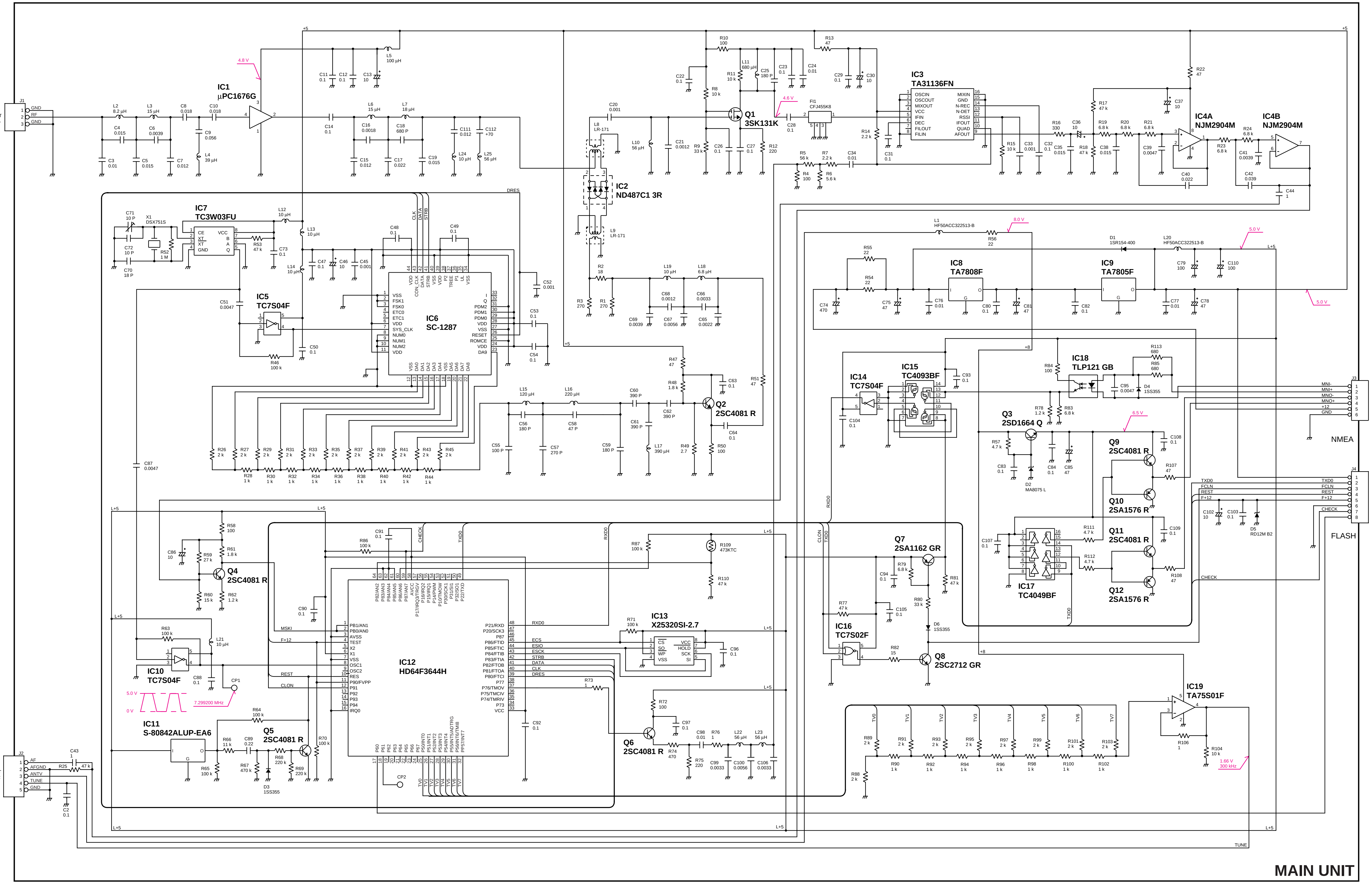
RIGHT SIDE

10-2 RD-200

• ANT UNIT



• MAIN UNIT



IC1
µPC1676G
IC2
ND487C1 3R
IC3
TA31136FN
IC4A
NJM2904M
IC4B
NJM2904M
IC5
TC7S04F
IC6
SC-1287
IC7
TC3W03FU
IC8
TA7808F
IC9
TA7805F
IC10
TC7S04F
IC11
S-80842ALUP-EA6
IC12
HD64F3644H
IC13
X25320SI-2.7
IC14
TC7S04F
IC15
TC4093BF
IC16
TC7S02F
IC17
TC4049BF
IC18
TLP121 GB
IC19
TA75S01F
Q1
3SK131K
Q2
2SC4081 R
Q3
2SD1664 Q
Q4
2SC4081 R
Q5
2SC4081 R
Q6
2SC4081 R
Q7
2SA1162 GR
Q8
2SC2712 GR
Q9
2SC4081 R
Q10
2SA1576 R
Q11
2SC4081 R
Q12
2SA1576 R
to ANT unit J1
to ANT unit J2
NMEA
FLASH
MAIN UNIT

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